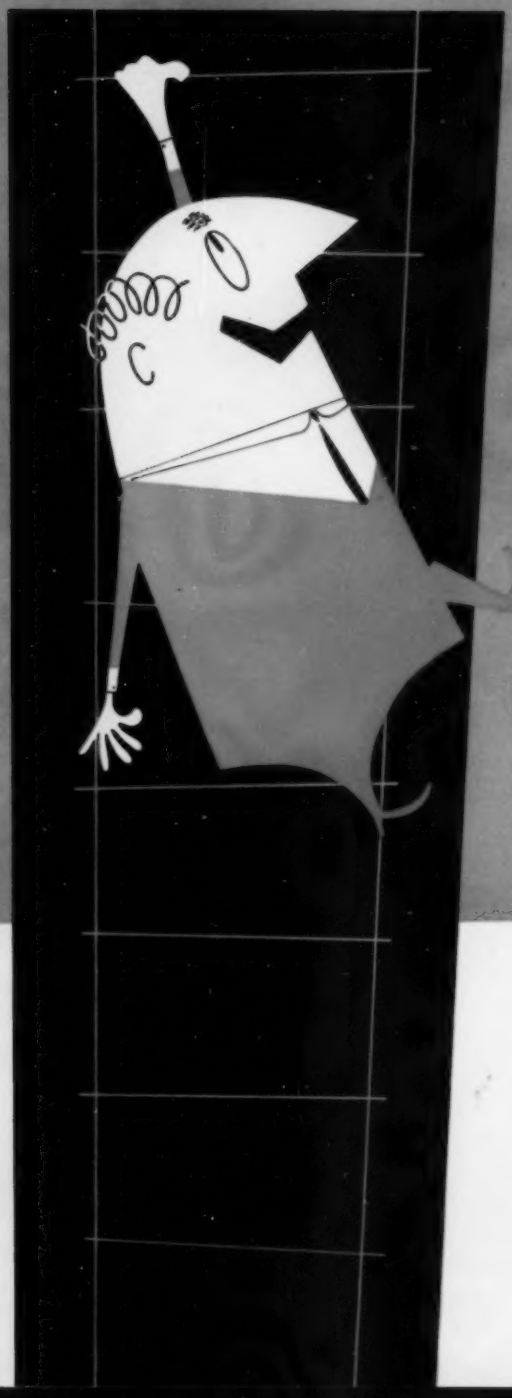
A PROGRAM FOR MANAGEMENT
1957 . . . No. 1

MARCH 18, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



MANAGEMENT DEVELOPMENT

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✓ Automation for Short Runs . . . page 104

✓ Where the Steel Went in '56 . . . page 178

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EC&M Lightweight 55" MAGNET

- HANDLES LIGHT SCRAP AT LOWER COST
- WEIGHS UP TO 25% LESS WITH COMPARABLE LIFTING CAPACITY
- FASTER OPERATION OVER WIDER WORKING RADIUS

This magnet, developed by EC&M engineers, is the lightest weight 55-inch magnet. High strength and water-tight construction are maintained with a completely ALL-WELDED design. Elimination of bolt-head recesses allows a better proportion for coil space, giving high lifting capacity. Welding also keeps pole shoes tight.

The companion EC&M lightweight 45-inch magnet has already become popular because its faster maneuverability and greater working radius permit more trips per day. The larger 55-inch magnet incorporates the same profitable advantages. Get the facts...see how these lightweight magnets can cut *your* light scrap handling costs.

Write for Bulletin 900-L

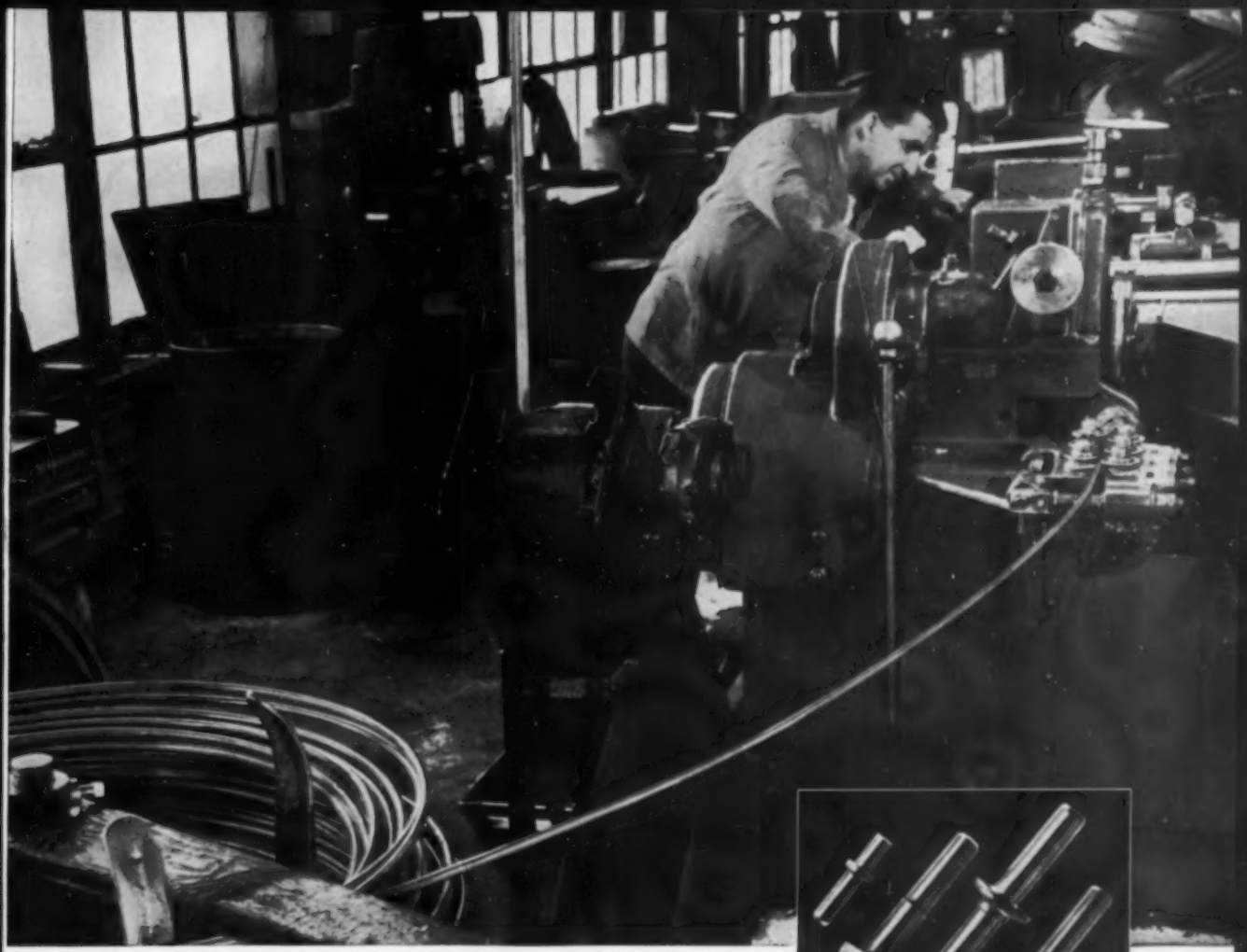
The companion EC&M 45"Lightweight Magnet, now in wide use on boom-cranes

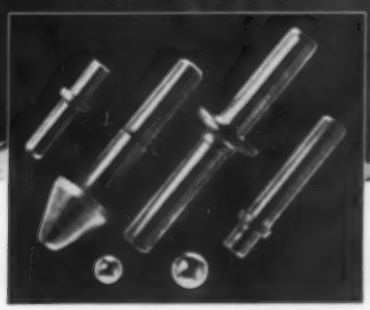
THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

7460





COLD-HEADED FROM STEEL WIRE

At the right is a group of parts cold-headed by The Bassick Company, Bridgeport, Conn., from Bethlehem Cold-Heading Wire.

A leading manufacturer of casters, The Bassick Company also makes chair controls, automotive hardware, and other products. We have been supplying them with cold-heading wire for years. Production men at Bassick speak highly of the care Bethlehem exercises in making wire to meet their various requirements.

Steel wire for cold-heading is a Bethlehem specialty. Cold-heading wire has to withstand a lot of punishment — upsetting, extrusion, slotting, punching, pointing, and other operations. And when heat-treating follows cold-heading, the steel must respond properly to carburizing and other hardening treatments. Uniform gage and composition of the steel are of the highest importance always.

There are many other points which we watch carefully. Proper internal soundness and freedom from injurious surface imperfections are of special importance, because heading operations may cause even minor flaws to open up into wide cracks.

One of our technical men will be glad to discuss steel wire with you — whether you are planning to use wire for cold-heading or for some other application. Bethlehem makes nearly all kinds of steel wire. Let our nearest sales office give you full details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

LAY THAT PISTOL DOWN PAL

There's an easier way out of your bearing troubles

Russian roulette may seem to be the easiest and quickest way out when bearings start to go and production starts to stop. But quicker still is a replacement from an authorized **SKF** distributor. He's the man to see for *all* types of anti-friction bearings and pillow blocks, and he's the man who will give you prompt service 24 hours a day. This factory trained specialist is ready to help you select the right bearing for the job. His broad experience in solving problems of maintenance means proper guidance in protecting your bearings for longer life. Doing business with the right distributor—the **SKF** distributor—is good business and good assurance of getting the bearings you need when you need them.

7748

SKF®

EVERY TYPE—EVERY USE

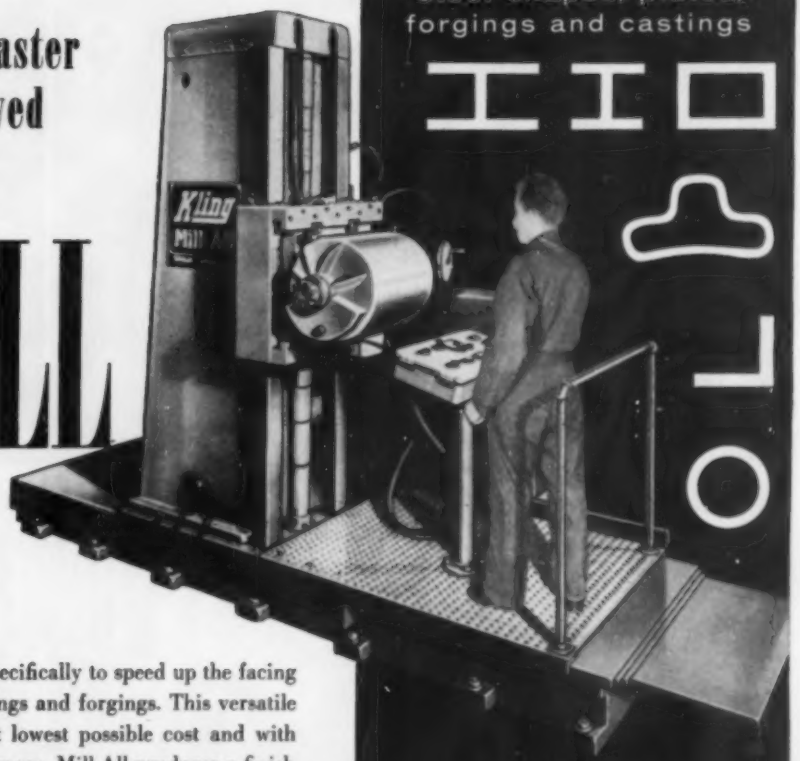
Ball Bearings
Cylindrical Roller Bearings
Spherical Roller Bearings
Tapered Roller Bearings ("Tyson")

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

CUT
up to 1,000% Faster with New Improved Kling
MILL-ALL

for facing all structural steel shapes, plates, forgings and castings



The new Kling Mill-All is designed specifically to speed up the facing of structural steel shapes, plates, castings and forgings. This versatile machine cuts up to 1,000% faster at lowest possible cost and with exceptional ease of operation. What's more, Mill-All produces a finish better than most commercially-milled finishes.

Extra power is an important feature of the Mill-All. 40 h.p. is standard with 75 h.p. cutter motor available. Almost any size of machine and type of worktable are available to make Mill-All adaptable to any production requirement and diversified use.

Write today for the new Mill-All bulletin with complete details and specifications!

This outline of average Mill-All cutting times on structural shapes will give an idea of the important time-savings that can be made with this machine. Depth of cut is ½" except for plate facing where depth of cut is ¼". Time given is for 1 cut.

Type of Work	Time
4" - 13 lb. B.S.	6 seconds
6" - 12.5 I-Beam	8 seconds
24" x 12" x 100 lb. W. F. Beam	48 seconds
8" x 8" x 1" Angle	14 seconds
24" x 36" plate, face one side	8 minutes

Here Are A Few Of The Important Kling Mill-All Features...

- Primary construction of steel weldments
- Ball bearing type feed screws covered by telescoping brass covers
- Both horizontal and vertical ways have non-metallic facings
- Telescoping steel covers protecting horizontal ways and base are strong enough to walk on
- Slide mounted motor gives 10" of in-and-out cutter travel
- Each machine has two rates of feed—based on customer requirement; maximum feed 80" per minute

For data on other Kling Metal Working Machines ask for Bulletin 100

Since 1892

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1633

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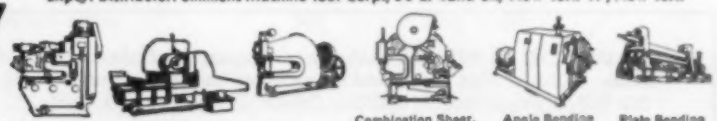
Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Ont.
Export Distributor: Simmons Machine Tool Corp., 50 E. 42nd St., New York 17, New York



Rotary Shears | Friction Saws | Punches | Combination Shear, Punch & Coper | Angle Bending Rolls | Plate Bending Rolls

G.T.M. More than doubles life of tin line rolls

ABOUT 18 MONTHS was considered excellent service for the rubber covered rolls in the plating compartments of this tin line. Abrasion and cutting plus constant immersion in approximately 200° F. sodium stannate solution were the life-limiting factors.

Then rolls specified by the G.T.M.—Goodyear Technical Man—were put to the test. They served an average of 3 years and 7 months—were worn down only 1/16" in turning out 4,000,000 base boxes or 71,000 miles of tin plate. And with regrinding they'll be ready for many miles more!

The G.T.M. may well have a similar answer to your rubber covered roll or other industrial rubber problems. Why not find out by contacting him through your Goodyear Distributor? Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

RUBBER COVERED ROLLS by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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The Metalworking Weekly
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behind the scenes

Tomorrow's Top Brass

STEEL this week considers the grooming of middle management for top jobs. One of the responsibilities of top management is the adequate grooming of the immediate line of succession.

You can look anywhere in history or business and observe the chaos that swirls in the wake of any top management that failed to establish competent succession. Let's take a look at a Roman emperor named Caligula, a real gone kid who liked entertainment at dinner: While he feasted, he arranged to have friends and acquaintances beheaded. The sight seemed to improve his digestion.

This boy got in solid with his boss, Tiberius, who appointed him executive vice president of the Roman Empire Inc., after which Tiberius dropped dead. Caligula was about 27 at the time, and what do you suppose he did about grooming a successor? He selected his uncle Claudius, a fussy old bird who distinguished himself by writing 43 volumes of Roman history, and marrying four female monsters. Caligula managed the enterprise for four years, at the end of which period his faithful bodyguards carefully cut him into chunks of stuff resembling stew meat, and uncle Claudius was named top dog.

Four more years of mismanagement resulted. Most of the top level decisions were made by two of his more horrible wives, Messalina and Agripina. The latter finally poisoned Claudius, and gave his job to her son Nero. By the way, STEEL's story appears on page 93.

Steeler Spielers

Almost at any given time you can find a STEEL staffer somewhere far from Cleveland, either picking up information or handing it out. Irwin Such, Walt Campbell, Vance Bell, John Morgan and Al Gray frequently appear as featured speakers before varied civic and industrial groups. STEEL has access to an impressive amount of business, technical and marketing information, and when these men hit the platform, they just ain't beatin' their gums, Jack.

Eileen Cortes, keeper of the scrapbooks, reports that where STEEL speakers speak, publicity followeth. Last week a carrier pigeon brought in a report from Newman R. Ladabouche, our distant wandering circulation and research director. It was revealed that Newman had attended the Machine Tool Distributors Association assembly at Palm Springs, Calif., and had discoursed at length on machine tool markets. The statistics he carried in his head were amplified by charts and slides, and our question, Mr. Anthony, is this: When all those machine tool distributors were frolicking in the Palm Springs pool, were they considering Newman's statistics, or were they considering the lousy March weather they would be obliged to face when they returned East?

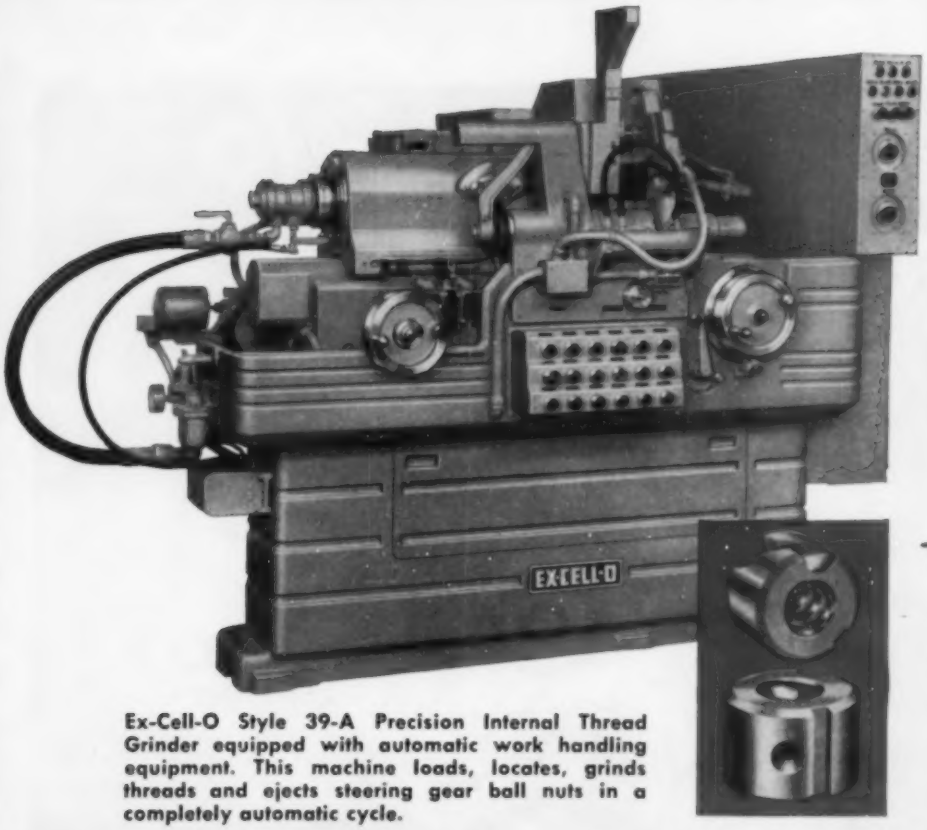
64-Cent Question

"Charlsie et al," of the Granite City Steel Co. gang, Granite City, Ill., hasten by postcard to confess that they like to "get there fustest with the mostest," and that Civil War questions are definitely their cup of tea. Some faint twinge of suspicion, however, moved them to suggest that a true southern gentleman in their midst swore to them that it was the *Merrimac* that fought the *Monitor* to a draw. Ah, Charlsie, you should know by now that Shrdlu is a sneaky old goat. The Confederate vessel that fought the *Monitor* was the *Virginia*. She was built on the hull of the former *U.S.S. Merrimac*, sunk by the Confederates and later salvaged.

Since silly questions, stirred up by the current TV quiz craze, appear to be the last word in mental entertainment, mull this one around for 64 cents: When the Civil War ended, Lincoln's Emancipation Proclamation was almost two and a half years old, yet certain Americans could still own slaves in the U.S. Where?

Shrdlu

(Metalworking Outlook—Page 47)



Ex-Cell-O Style 39-A Precision Internal Thread Grinder equipped with automatic work handling equipment. This machine loads, locates, grinds threads and ejects steering gear ball nuts in a completely automatic cycle.

Short Runs, High Production, or Automation with Ex-Cell-O Thread Grinders

EX-CELL-O STYLE 33 FOR EXTERNAL THREADS: An accurate production machine, automatic except for loading, unloading, and moving the cycle lever. Can be arranged for tapered grinding and for eccentric relief grinding.

EX-CELL-O STYLE 36 FOR LONG EXTERNAL THREADS, also available with internal attachment. A high production machine with easily adjusted work cycles.

EX-CELL-O STYLE 50: A versatile machine for external work . . . also available with internal attachment.

EX-CELL-O STYLE 120: Our largest Thread Grinder. Grinds 10 feet of thread in one setting. Accommodates 12 feet of stock between centers.

These standard machines are grinding thread gages, machine tool lead screws, innumerable aircraft parts, automotive steering mechanisms and pinions, worms, taps, and many similar workpieces.

Precision thread grinders in this Ex-Cell-O line range from manually-operated models, for toolroom and for short runs, to high production automatics, to styles equipped with automatic work handling equipment. There are five models designed to meet your every requirement.

For specific information, call your local Ex-Cell-O representative.

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Has a 20 to 1 chromium-to-carbon ratio, gives only 0.05% carbon pickup for each per cent of chromium added.

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Has a 12.5 to 1 chromium-to-carbon ratio, gives a carbon pickup of 0.08% for each per cent of chromium added.

Exothermic Silicon-Chrome
Has the following analysis: Chromium—41.50 to 44.50%; Silicon—21.75 to 24.75%; Carbon—0.70%. Carbon pickup is only 0.016% for each per cent of chromium added.

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FERRO-ALLOYS AND METALS

The Heyl & Patterson Turnover Car Dumper and the Ore Bridge in the foreground typify the services rendered to the Steel Industry.

From railroad car to blast furnace high-line

the handling of ore is entrusted to Heyl & Patterson equipment. The stock pile is wider and higher, the operation more economical, and storing and recovering of ore is accomplished at higher rates of speed.

Every time you install an H&P Traveling Turnover Car Dumper or an H & P Ore Bridge, or both as in this plant of The Pittsburgh Steel Company at Monessen, Pa., you are employing the best tools for bulk material handling.

Over 70 years, H&P engineers have established a reputation for our products. We strive to continue in the forefront of progress.

Barge and Boat Unloaders

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Ore Bridges

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Specialized Conveying Systems

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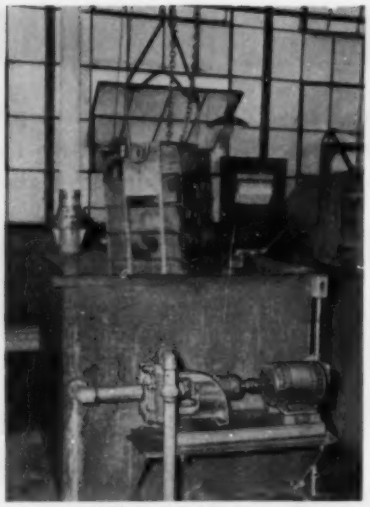
Count On Heyl & Patterson

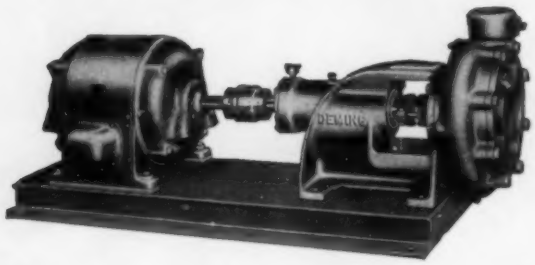
Heyl & Patterson INC.

55 FORT PITT BLVD., PITTSBURGH 22, PA. • COurt 1-0750

Deming Fig. 4011 Centrifugal Pump delivers 180° caustic solution at rate of 100 g.p.m. against 46-foot head for degreasing trays of hand tools.



Same load of hand tools is rinsed in wash water tank served by another Deming Fig. 4011 Centrifugal Pump at 100 g.p.m. against 46-foot head.



What's *Your* job for this Versatile Deming Pump?

Champion de Arment Tool Company, Meadville, Pa., has a dual job for two identical Deming Fig. 4011 End Suction Centrifugal Pumps. "CHANNELLOCK" pliers and other famous hand tools are manufactured by that company.

Degreasing and rinsing trays of these tools is the dual job serviced by the Deming Pumps, as illustrated in the above views. *What's YOUR job for this versatile Deming Pump?*

Optional features of Fig. 4011 make it readily and economically adaptable for handling a wide variety of liquids, including many corrosive materials.

Bulletin No. 4011-B gives all the facts. Ask for your free copy.

THE DEMING COMPANY • 535 BROADWAY, SALEM, OHIO

DEMING

INDUSTRIAL PUMPS

LETTERS
TO THE EDITORS

Fact or Fancy in 1958?

Please send a copy of your article, "Short Week: Fact Vs. Fancy" (Feb. 18, page 107). I enjoyed reading this story and wish to retain a copy until it becomes fact or fancy in 1958.

Vincent Lodestro
Mfg. Engineering Department
Ford Aircraft Engineering Division
Ford Motor Co.
Chicago

Missile Materials Sought

Please send 20 copies of the fine article, "Needed: Materials for Missiles" (Feb. 25, page 86). It explains some of the materials one of our client companies is working on, and we want to send their salesmen copies of it.

John L. Willett
Crier Advertising Service
Cleveland

Unrest in Labor Ranks

The Feb. 11 issue carried an article, "Labor Ferment Rising" (page 64). An additional six copies would be appreciated.

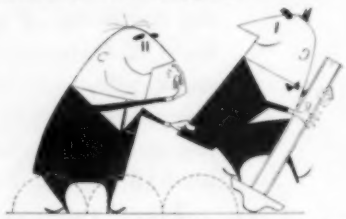
H. E. White
Director, Personnel
Autonetics
Division of North American Aviation Inc.
Downey, Calif.

Gain in New Steel Usage

I would like 12 reprints of the timely article, "Fast Start for 200 Series" (Feb. 11, page 104) for distribution to my salesmen.

M. C. Barran
Manager
Warehouse Division
Atlantic Steel Co.
Atlanta

Cutting Job Hopping



We would appreciate receiving four copies of your excellent article, "Auto Makers Woo Engineers" (Feb. 25, page 64).

V. H. Hiers
Product Engineer
Engineering & Research Division
Hamilton Mfg. Co.
Two Rivers, Wis.

Approach to Waste Disposal

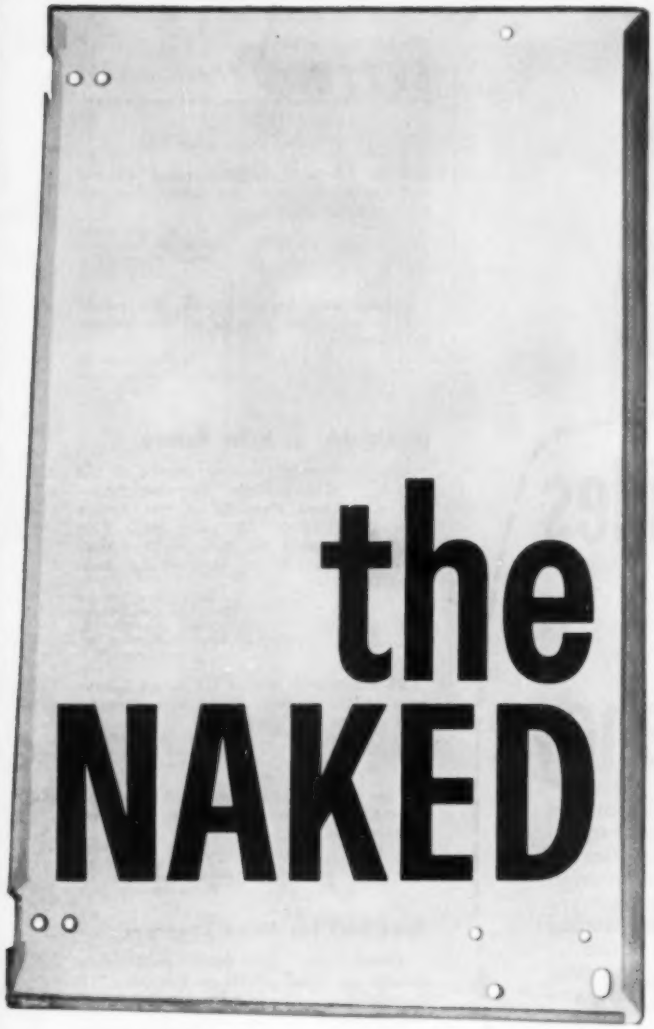
I would like a copy of the excellent article, "Ideas for Waste Treatment" (Feb. 18, page 150).

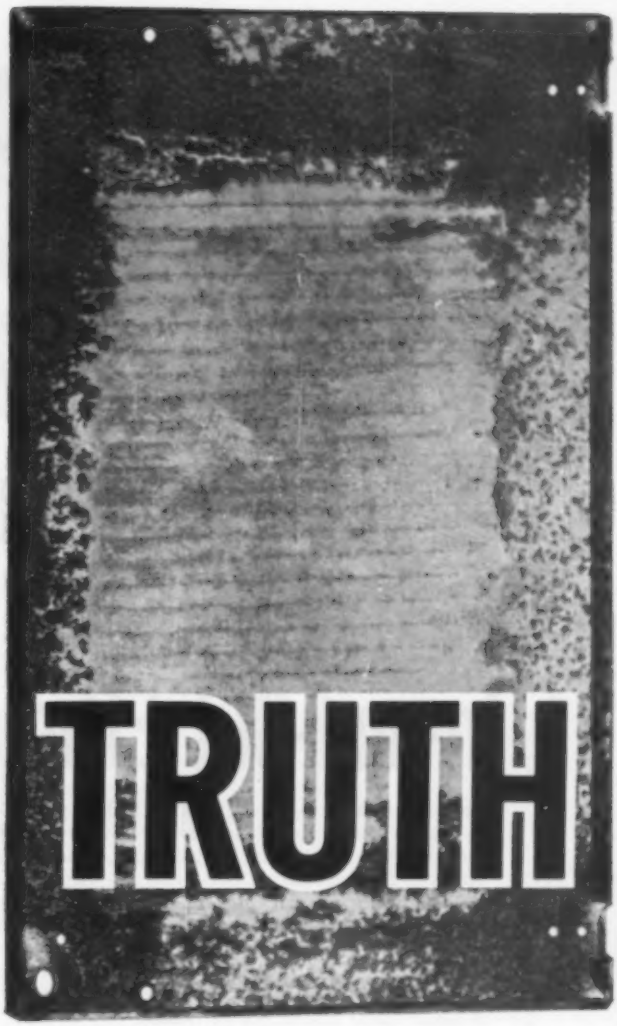
R. H. Barker
Assistant to Chief Engineer
Mallory-Sharon Titanium Corp.
Niles, O.

Potential Investigation

Your article, "Cold Heading Branches Out" (Jan. 14, page 71) was interesting. I would like two copies: One for our engineering department to double check to see if we have investigated all po-

(Please turn to page 12)





Even after a year's exposure to storms, salt and humidity on a Florida pier a two-piece hollow kitchen cabinet door of Weirzin electrolytically zinc-coated steel remained gleaming bright on the inside, and held its finish beautifully on the outside. Note what happened to the inside of the plain steel door that went through the same test. That's rust and lots of it . . . a completely ruined product both inside and out.

There's a profitable moral for *you* in that story—of a comparison test conducted by a leading manufacturer of kitchen cabinets for its own satisfaction. The moral: You can protect your products right from the start by using Weirzin right from the start. Its skin tight electrolytically fused zinc coating, uniformly applied, takes the toughest fabricating steps without peeling or flaking. Because it *does* stand up under the severest bending, drawing, crimping, flexing, you can forget coating or recoating—and its extra cost.

Furthermore, chemically treated Weirzin takes paint, enamel and lacquer beautifully, holds them indefinitely, eliminates underfilm corrosion.

Send for free booklet . . . get all the facts on Weirzin's many cost-saving advantages. Write to Weirton Steel Company, Dept. B-9, Weirton, West Virginia.

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LETTERS

(Concluded from page 10)

tentials for cold headed parts in our end products, and the other for our buyer of this type product.

H. W. McKeague
Director of Purchases
Motor Wheel Corp.
Lansing, Mich.

Kindly send us 12 copies. We would like to see more articles of this nature on fasteners.

Robert Herman
Manager, Fastener Sales
Jaques Co.
Boston

Invaluable in Near Future

Kindly forward several copies of the article, "Management Development—The Care and Feeding of the Junior Executive" (Feb. 11, page 93). This article interested me and perhaps may prove invaluable to us in the near future.

J. Alden Johnson
Statistics Department
Omega Machine Co.
Division of B-I-F Industries Inc.
Providence, R. I.

This article is one of the finest I have seen on the subject. I would appreciate five copies.

D. E. Brutzman
Buffalo Tank Corp.
Dunellen, N. J.

This is a timely topic, and you have covered it thoroughly. Please send me four copies.

J. M. Rhodes
General Manager
Marine Fabricators Co.
Perth Amboy, N. J.

Excellent for Heat Treaters

Thank you for your publication, "Guide to Tool Steels & Carbides." It is excellent for people in the heat treating business.

Clarence Graham
Metal Treating Inc.
Milwaukee

Aid to Congressmen

The staff of the Legislative Reference Service has noted that your article, "Ports Race Seaway" (Feb. 4, page 63), would be most useful to us in answering inquiries from members of Congress. We would appreciate 12 reprints.

Charles A. Goodrum
Librarian
Legislative Reference Service
Library of Congress
Washington

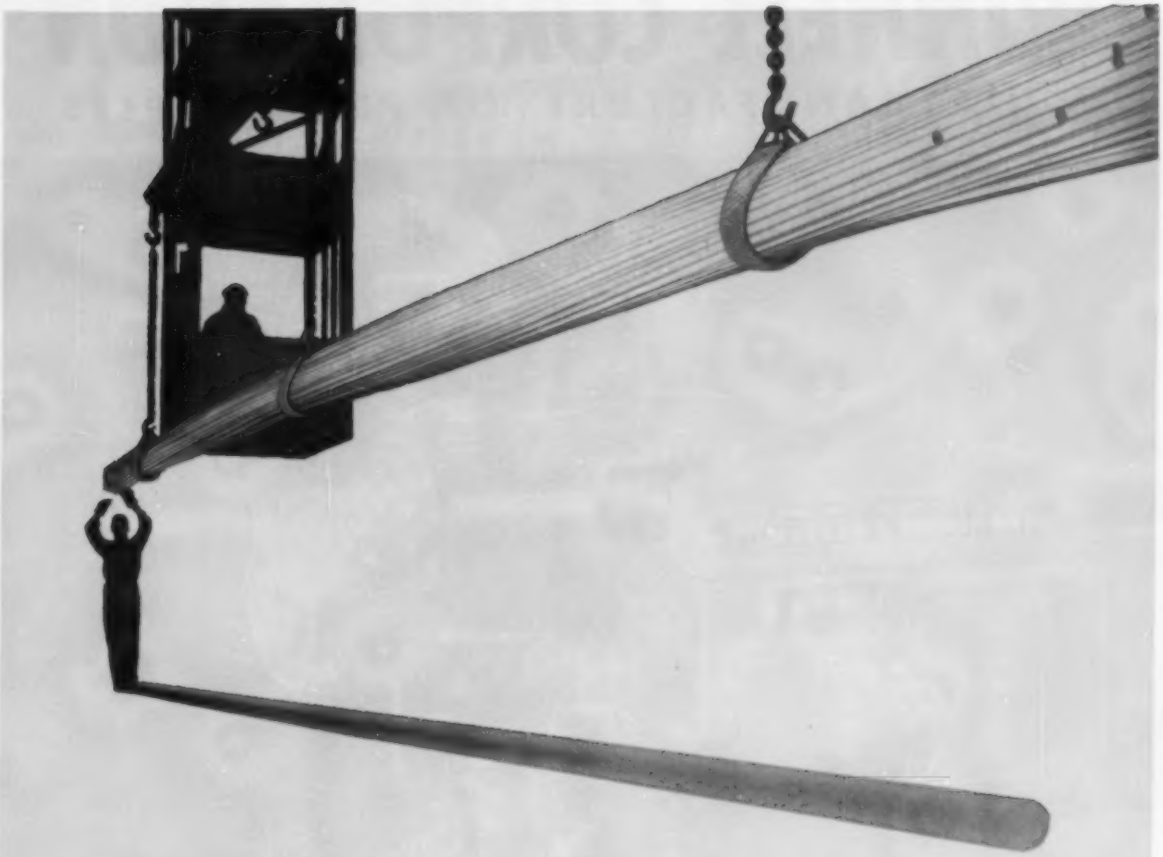
Please send a copy of this article. I would like to keep it handy as a future reference.

R. W. Grigg
General Manager
Industrial Development
Freight Sales & Services
Pennsylvania Railroad Co.
Philadelphia

Wants 1933 STEEL Article

We are compiling a bibliography on the rolling of metals, and your article, "Analysis of Factors Influencing Rolling Pressure and Power Consumption in the Hot Rolling of Steel" (Aug. 21, 1933, page 27) is of extreme interest to us. Please forward two copies.

Jack Rothschild
Vice President
Eastern Rolling Mills Inc.
New York



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SEAMLESS STEEL TUBING

Pacific Tube Company can now supply you with precision, cold-drawn Seamless Steel Tubing in absolutely straight lengths up to 58 feet long. Special new equipment, including new pickling tanks 60 feet long makes this feat possible. The longest draw bench in the country helps, too!

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A wide range of sizes is quickly available in many chemistries in Stainless, Seamless Carbon and Alloy Tubing... cold-drawn to your exact specifications.

If you are faced with an application or metallurgical problem, our engineering staff can be of valuable assistance... just let us know your problem.

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COLD-DRAWN BARS
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Precision drawn to rigid specifications from 3/16" thru 3½" in many chemistries including Ledloy Grades A & B.

Pacific
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5710 Smithway St., Los Angeles 22, Cal.

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GRINNELL CORPORATION

IN ITS MANUFACTURE OF PIPE NIPPLES

Bardons & Oliver Cutting-Off Lathes are available in eight sizes ranging from 2″ dia. capacity to 16″, and are built as Automatic, Semi-Automatic or Hand Operated.

Standardizes on

BARDONS & OLIVER Cutting-Off Lathes

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PIPE, FITTINGS AND VALVES
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PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

January 8, 1957

Bardons & Oliver, Inc.
1133 West 9th Street
Cleveland, Ohio

Gentlemen:

The four (4) Bardons & Oliver Automatic Cut-off Lathes which we installed last year to produce our pipe nipple blanks are giving satisfactory performance and effecting substantial cost reduction.

Since our new Bardons & Oliver Lathes form a concentric chamfer at each end of the nipple blank while cutting it off, the cutter life on the subsequent threading operation is increased.

Another substantial benefit derived from the installation of your Cut-off Lathes is the accurate and uniform lengths of nipple blanks produced. This assured control of length permits automatic feeding of the nipple blanks to the threading machines without the jam-ups and breakdowns previously experisnced. Furthermore, it results in the production of a more accurate and more saleable pipe nipple.

Based upon the savings outlined above, the Grinnell Corp. has standardized on Bardons & Oliver equipment for cutting and chamfering their complete line of pipe nipples from 3/8" to 2-1/2" sizes.

Very truly yours,

GRINNELL CORPORATION

J. D. Sidells
Plant Engineer

JDS:PK

cc: (2)

PRODUCTS SOLD EXCLUSIVELY BY GRINNELL COMPANY, INC. AND GRINNELL COMPANY OF THE PACIFIC

BARDONS & OLIVER, INC.

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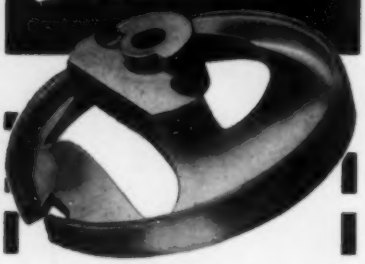

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PART: Cam for Aircraft Instrument

MATERIAL: Stainless Steel, 440

PROBLEM: To reduce time and cost involved in setting up and performing 8 different types of machining operations.

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2. Turning O.D.
3. Center Hole Drilling
4. Form Turning
5. Form Milling
6. Contour Milling
7. Slot Milling
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Leaving only cam polishing, bottom grinding and hole reaming.

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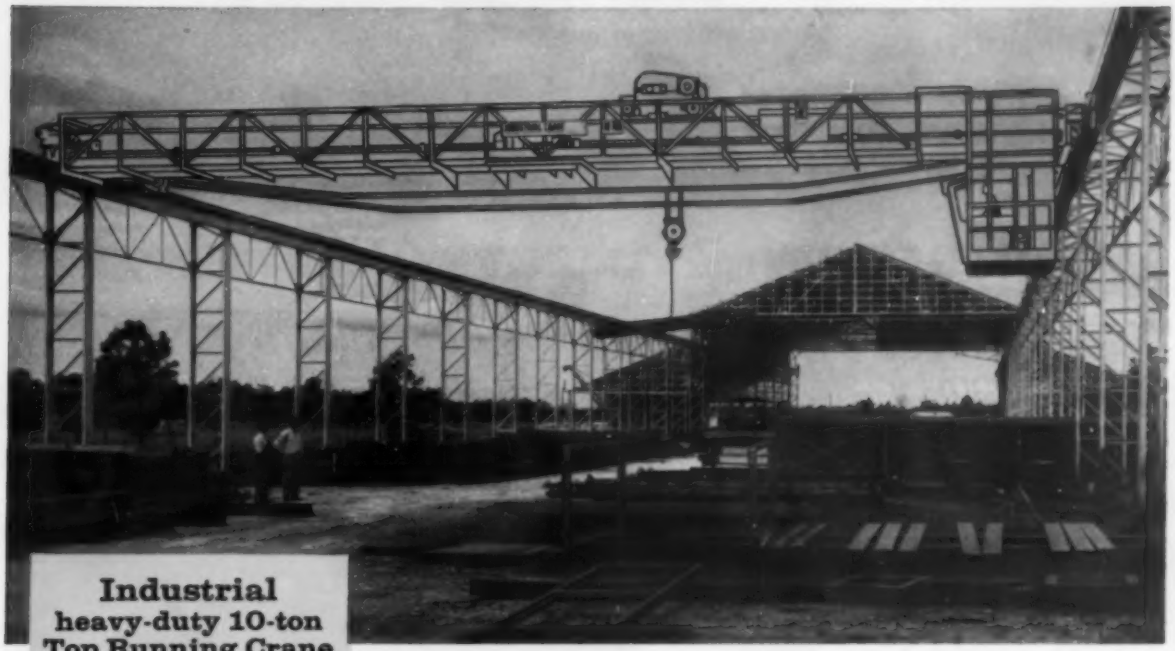

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Heavy duty roller bearings throughout.

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. . . thanks to the modern design of this

Industrial

HEAVY-DUTY CRANE

It takes smooth running, ruggedly built equipment to keep steel moving in and out of this yard with minimum effort. That's why this southern warehouse chose **Industrial** after a careful study of all overhead cranes.

Industrial's modern "heavy duty" crane designs incorporating the latest components, plus precision manufacture means better performance, smoother operation and greater overall savings to you.

For your next crane, it will pay you to consult Industrial.

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HD8-357C

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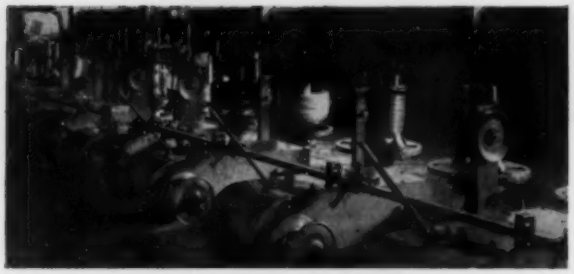


SPOOLING OPERATION—Coils of Youngstown Wire are placed on winches from which the wire passes over a sheave and guide onto the bobbin in the foreground.

STRANDING OPERATION—Filled bobbins are placed in the stranding machines for forming the individual wires into strands. In these machines from 7 to 41 bobbins are placed, all wires emerging at the forward end being formed into a single strand which passes over the draw works and onto the larger bobbin shown at right.

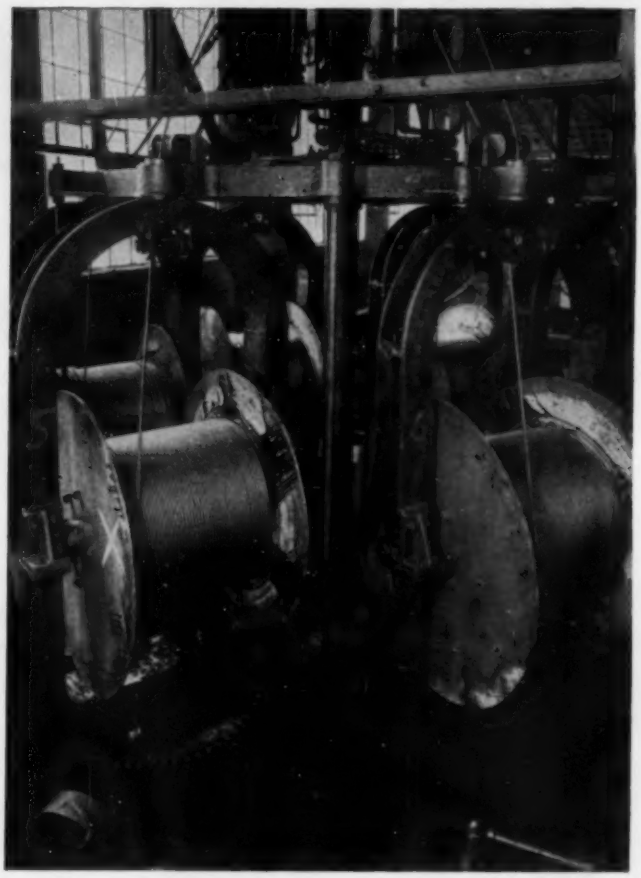
YOUNGSTOWN "YOLECTRO" ROPE WIRE

... helps maintain high quality of Broderick Bascom Yellow Strand wire rope

For over half-a-century Broderick & Bascom Yellow Strand wire rope has enjoyed a world-wide reputation for excellence of both workmanship and finished product. To maintain their high quality standards, they use Youngstown "Yolectro" High Carbon Rope Wire as the basic material in the production of their various brands of wire rope. They have found over the years that it offers the required toughness and strength, abrasion resistance, gage uniformity, and flexibility to guarantee a Broderick & Bascom product of consistent quality.

"Yolectro" High Carbon Rope Wire is quality-controlled to provide the correct balance of properties to meet your most critical requirements. Why not make it your specification for quality production? It's available in both Bright and Galvanized finishes in all high carbon grades.

Metallurgical assistance or additional information may be received from your nearest Youngstown District Sales Office. Why not write or phone today?



CLOSING OPERATION—In this machine, six finished strands are formed around a center core of either fiber or independent wire rope.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

QUALITY YOUNGSTOWN SERVICE

Producers of Quality Carbon and Alloy Steels for Over Half-a-Century

Why Grandmother!

Stories on grinding wheel problems—just like the kind you tell the youngsters—can have a happy ending. And we're writing new ones day after day for plants where high grinding wheel costs and low production have been wolfing up profits.

If *you* are ready to "cry wolf," let us send CINCINNATI (PD)° WHEELS to the rescue. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can *save you money—and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, if grinding problems have you ready to shout for help, just contact your CINCINNATI Grinding Wheel distributor. Or, contact us direct and we'll send one of our representatives —men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone—Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .

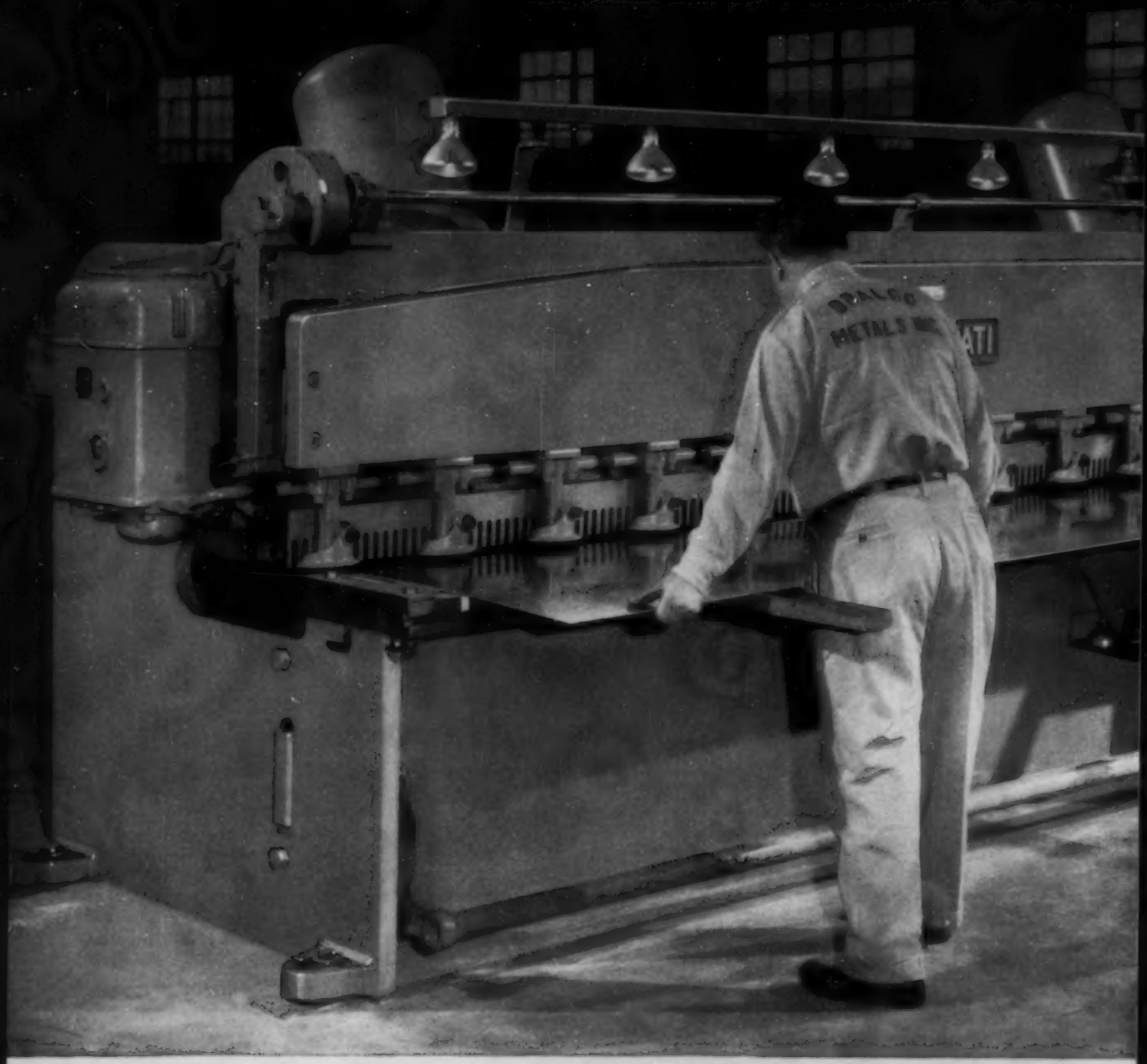
(PD) POSITIVE DUPLICATION

CINCINNATI°
Grinding Wheels

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

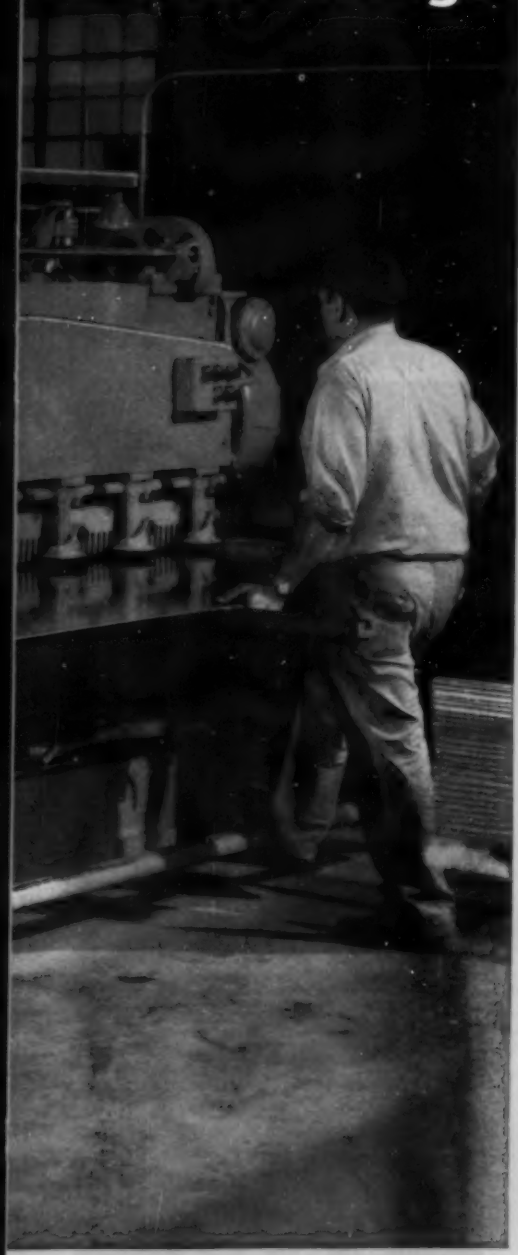
°Trade Mark Reg. U.S. Pat. Off.

Accurate CINCINNATI



The 1412 Series Cincinnati Shear is shown shearing aluminum sheet. High pressure hydraulic holddowns automatically clamp different gauges of metal with the same pressure.

SHEAR brings substantial increase in sales...



at BRALCO METALS, INC., Los Angeles, California

Micrometer accuracy in squaring, notching and slitting of aluminum sheet and plate makes this Cincinnati Shear a profitable producer. The Bralco Company states "There is no question that this Shear has been responsible for a substantial increase in our sales." Maintained accuracy is insured by hydraulic holddowns, low rake upper knife, inclined ram and all-steel, weld free construction.

Write **Department C** for Shear Catalog S-7R. We also suggest that you contact our Application Engineering Department for information on your shearing problems.

Photos courtesy Bralco Metals, Inc., Los Angeles 22, California.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

Reg. U.S. Pat. Off.

Readily Available Westinghouse Fans

Meet your Fume and Dust Removal Requirements

Whatever your air handling problem . . . smoke, fumes, vapor, dust, wood shavings, granular material or ventilating . . . these Westinghouse fans are designed to handle or remove them . . . efficiently and economically.

INDUSTRIAL FANS (Steel Casing) . . . high efficiency for general Air Handling; fume and dust removal; 11 sizes, each with 3 types of wheel for specific applications. Wheel diameters 19″ to 64″; inlet diameters 11″ to 37″.

INDUSTRIAL FANS (Cast Iron Casing) . . . ruggedly built, corrosion resisting. For low volume fume or dust removal, materials conveying, industrial drying and cooling. In 10 sizes, each with 3 types of wheel for specific applications. Wheel diameters 8″ to 34″; inlet diameters 4½″ to 18″.

VENTILATING SETS (Direct-Connected) . . . compact, efficient, ready-to-run. Especially suited for small ventilating installations. Cleanable radial blade wheel minimizes problem of handling airborne dirt and grease. Six sizes. Wheel diameters 6″ to 15″; inlet diameters 6″ to 14″.

VENTILATING SETS (V-belt driven) . . . self-contained. Install indoors or outdoors in a wide variety of heating, ventilating or air conditioning applications. Twelve sizes. Wheel diameters 9″ to 30″; inlet diameters 10″ to 32⅞″.

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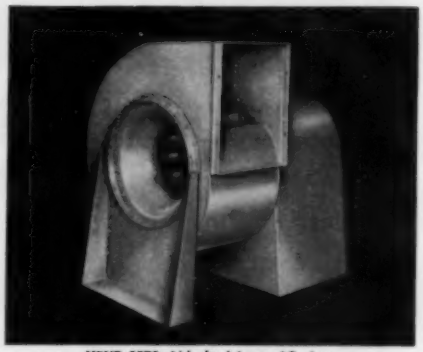
If there isn't one near you, call your Sturtevant Sales Engineer, or write Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

J-80619

YOU CAN BE SURE...IF IT'S Westinghouse

VENT SETS: Direct-connected, 6 sizes



VENT SETS: V-belt driven, 12 sizes

INDUSTRIAL FANS: Cast iron casing, 10 sizes

INDUSTRIAL FANS: High-efficiency steel casing, 11 sizes

CALENDAR
OF MEETINGS

Mar. 18-21, Society of the Plastics Industry Inc.: Annual national conference and plastics exposition, Biltmore hotel and Shrine Hall, Los Angeles. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Mar. 18-21, American Society of Mechanical Engineers: Gas turbine power conference, Sheraton-Cadillac hotel, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Mar. 20-22, Society of Automotive Engineers Inc.: National production meeting and forum, Hotel Statler, Buffalo. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 25-27, American Society of Tool Engineers: Annual meeting, Shamrock Hilton hotel, Houston. Society's address: 10700 Puritan Ave., Detroit 21, Mich. Executive secretary: Harry E. Conrad.

Mar. 25-29, Western Metal Congress & Exposition: Biennial exposition, Pan-Pacific Auditorium, Los Angeles. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Mar. 25-29, American Society for Metals: Biennial technical meeting, Ambassador hotel, Los Angeles. Society's address: 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

Mar. 25-29, Society for Nondestructive Testing: Biennial technical meeting, Ambassador hotel, Los Angeles. Society's address: 1109 Hinman Ave., Evanston, Ill. Secretary: Philip D. Johnson.

Mar. 26-27, Instrument Society of America, Pittsburgh Section: Annual conference on instrumentation for the iron and steel industry, Hotel Roosevelt, Pittsburgh. Information: Fred D. Marton, 845 Ridge Ave., Pittsburgh 12, Pa.

Mar. 27-29, American Power Conference: Hotel Sherman, Chicago. Information: Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

Apr. 1-3, International Acetylene Association: Annual meeting, Nicollet hotel, Minneapolis. Association's address: 205 E. 42nd St., New York 17, N. Y. Secretary: H. F. Reinhard.

Apr. 2-4, American Hot Dip Galvanizers Association Inc.: Annual meeting, Empress hotel, Miami Beach, Fla. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Apr. 2-5, Society of Automotive Engineers: Aeronautic meeting and production forum and aircraft engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

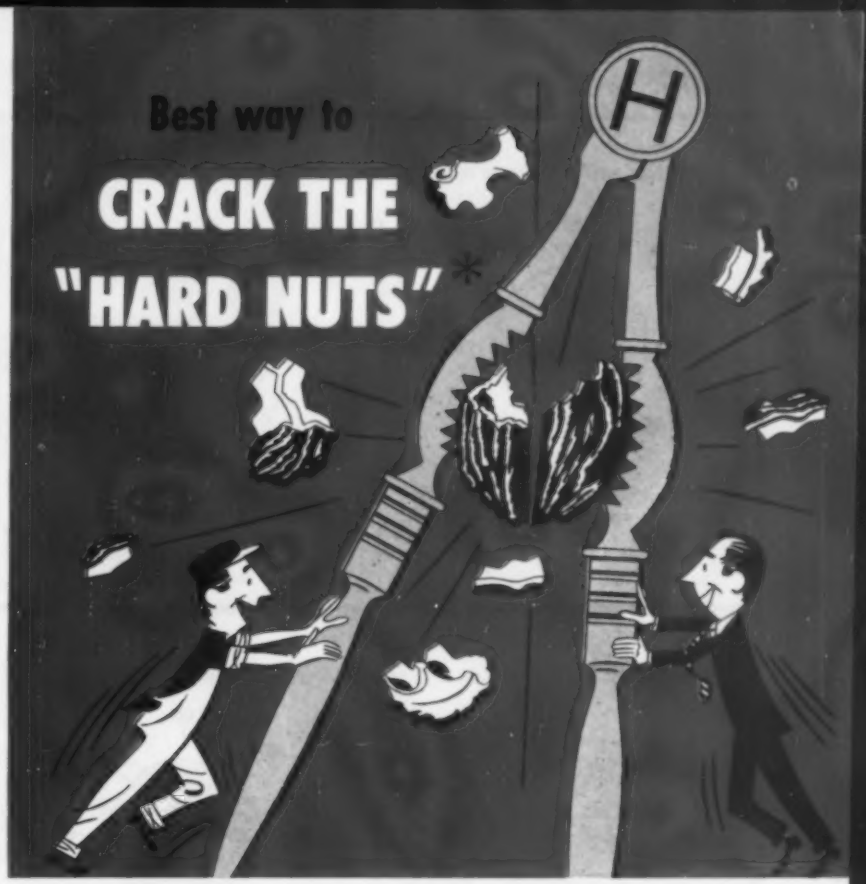
Apr. 7-10, National Screw Machine Products Association: Annual meeting, Shoreham hotel, Washington. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Werntz.

Apr. 8-10, American Institute of Mining, Metallurgical & Petroleum Engineers: Open hearth and blast furnace conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Apr. 8-10, Gas Appliance Manufacturers Association: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: Harold Massey.

Apr. 8-10, Metal Treating Institute: Spring meeting, Boca Raton hotel and club, Boca Raton, Fla. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

Apr. 8-12, American Welding Society: Spring technical, national meeting and welding show, Sheraton and Bellevue-Stratford hotels and Convention Hall, Philadelphia. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: J. G. Magrath.



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Call on the skill of experts when your production line faces the need for difficult-to-make parts. Specify HAMILTON QUALITY CASTINGS®

Hamilton Foundry has "cracked the hard nuts" for 66 years . . . is thoroughly experienced at producing castings to meet regular and special applications. Seasoned engineering, and quality control throughout assure you of sound castings with dimensional accuracy.

And remember this important advantage: HAMILTON QUALITY CASTINGS® are produced in a wide variety of irons to meet the most exacting properties required by your service conditions.

See our exhibits 424 and 426 at the First Engineered Castings Show, sponsored by The American Foundrymen's Society, at Music Hall, Cincinnati, O., May 6-10, '57.

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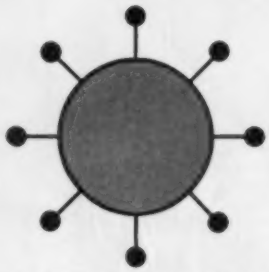
NI-HARD
NODULITE®

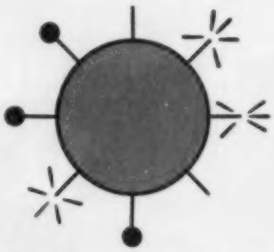
H57-3

THE HAMILTON FOUNDRY
AND MACHINE CO.
1551 Lincoln Avenue • Hamilton, Ohio
Phone TWinbrook 5-7491

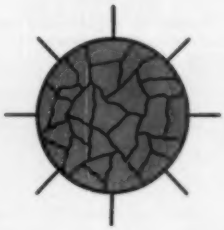
Does the solvent you use "go sour," like this?



1. The trichlorethylene you use for degreasing metal is protected by a stabilizer (small circles) against heat, light, air, moisture, acids and active metals like aluminum.

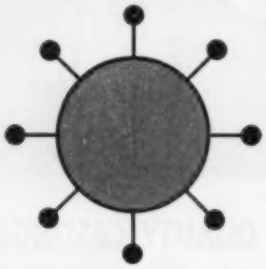


2. Ordinary stabilizers wear out or become depleted during normal use. With some solvents, you have to titrate your bath frequently, and may have to add fresh stabilizer.

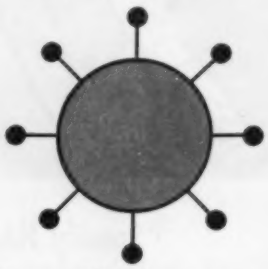


3. When stabilizer wears out, your degreaser doesn't function properly. It may even stain metal parts instead of cleaning them. You have to clean out the "sour" bath.

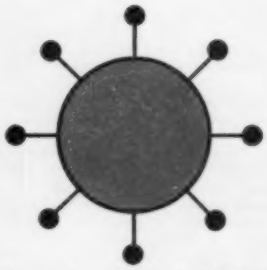
Use Nialk® TRICHLORethylene and get psp ... like this



1. You get full-time protection with NIALK stabilizer's unique action. Notice the difference between the next two diagrams and those above.



2. NIALK stabilizer does not wear out during normal use. It's always there, working. You never have to titrate your bath, or add fresh stabilizer.



3. Even after repeated distillations, you still have complete protection. All the stabilizer is active. Only NIALK has this **psp**—permanent STAYING power.

Why you pay less to degrease with Nialk® TRICHLORethylene

The drawings above demonstrate a difference—a big, cost-cutting difference—between NIALK TRICHLORethylene and conventional vapor-degreasing solvents.

NIALK has **psp**—permanent STAYING power—in its stabilizer. It's neutral, non-alkaline. You never have to replenish it.

psp means cheaper degreasing

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK with **psp** remains stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a resumé of comparative metallurgical tests on five leading brands.

HOOKER ELECTROCHEMICAL COMPANY

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Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER

HOOKER CHEMICALS PLASTICS

663W38

She's enjoying an afternoon by a beautiful pool

Mr. V. N. Agathor, Vice President of Production at La Consolidada, S. A., Mexico, Manufacturers of Malla-Lac—Concrete Reinforcing Wire Mesh.

—he helped make it possible with Sciaky Resistance Welding Techniques

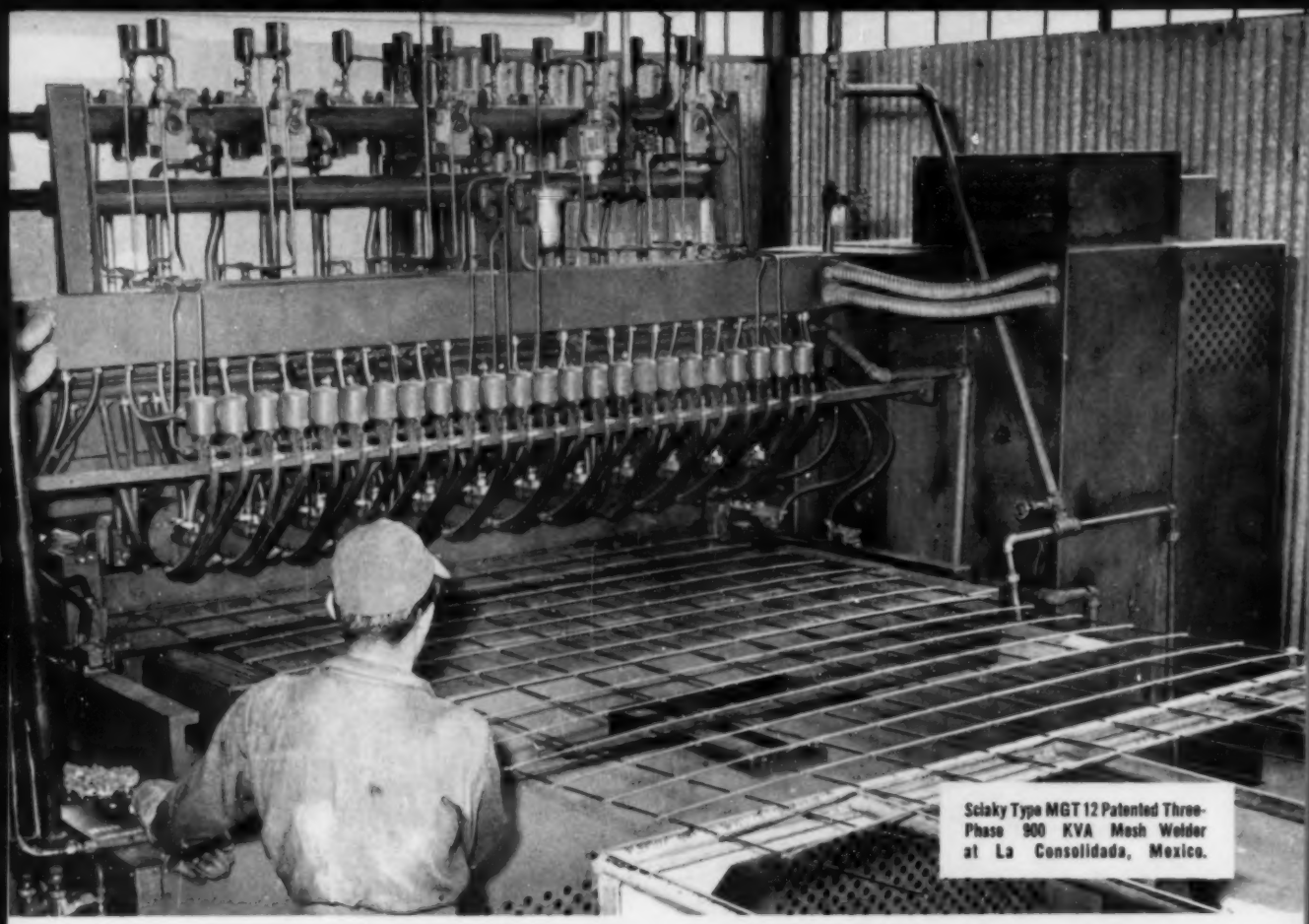
Not only are Mexican swimming pools made with La Consolidada concrete reinforcing wire mesh, but office buildings, commercial structures and private homes as well. Critical shortages of lumber and fabricated structural members in Mexico force the extensive use of reinforced concrete construction.

As the leading Mexican manufacturer of steel wire and wire products, industrial fasteners and merchant bar products, it was natural for La Consolidada to become the first to introduce resistance welded wire mesh for concrete reinforcing.

In their need for a production process that would satisfy their particular complex requirements, La Consolidada turned to Sciaky Resistance Welding Techniques exclusively. Because Sciaky Resistance Welding Techniques are designed to put the profits back into manufacturing! Turn the page for more information on how La Consolidada does it.

SCIAKY.

There are Sciaky plants in Chicago, Paris and London, as well as an Application Research Center in Los Angeles, California



Sciaky Type MGT 12 Patented Three-Phase 900 KVA Mesh Welder at La Consolidada, Mexico.

La Consolidada Offers 32% Savings in Steel to Building Construction with Concrete Reinforced Wire Mesh

***Sciaky Resistance Welding Techniques* used exclusively to introduce concrete reinforcing wire mesh to Mexico**

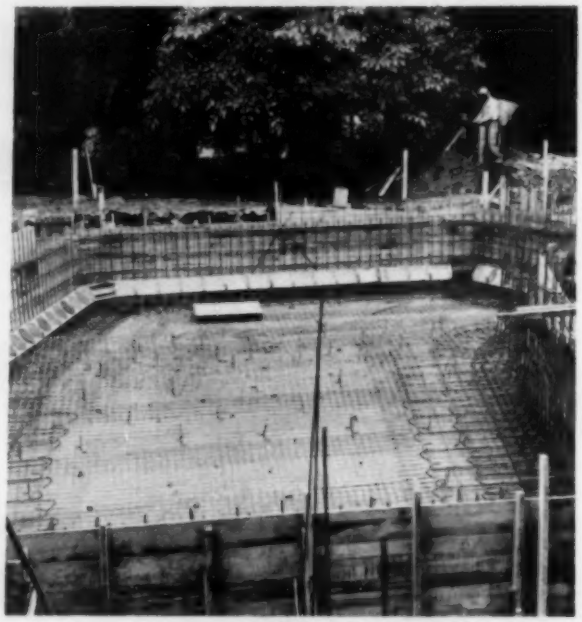
La Consolidada's wire mesh, called Malla-Lac, has received immediate, overwhelming acceptance and future production is already sold out. Much of this success is due to production methods and Sciaky equipment tailored to specific needs:

1. **Versatility to provide range of mesh and wire sizes.**
2. **Capacity to match needs.**
3. **Simplicity of operation and maintenance.**
4. **Dependability in heavy duty operation.**
5. **Lowest cost to put equipment in production.**
6. **Ability to get service in Mexico.**

Sciaky resistance welding techniques and equipment satisfy all of these requirements. It enables La Consolidada to sell Malla-Lac at a price competitive to reinforcing bar. It enables La Consolidada to produce a product of the quality necessary to building construction.

If *you* fasten metal products together to fabricate your products, take advantage of Sciaky Resistance Welding techniques—like La Consolidada does!

Further data is given in the publication "Resistance Welding At Work", Vol. 5, No. 2. Write for your copy.

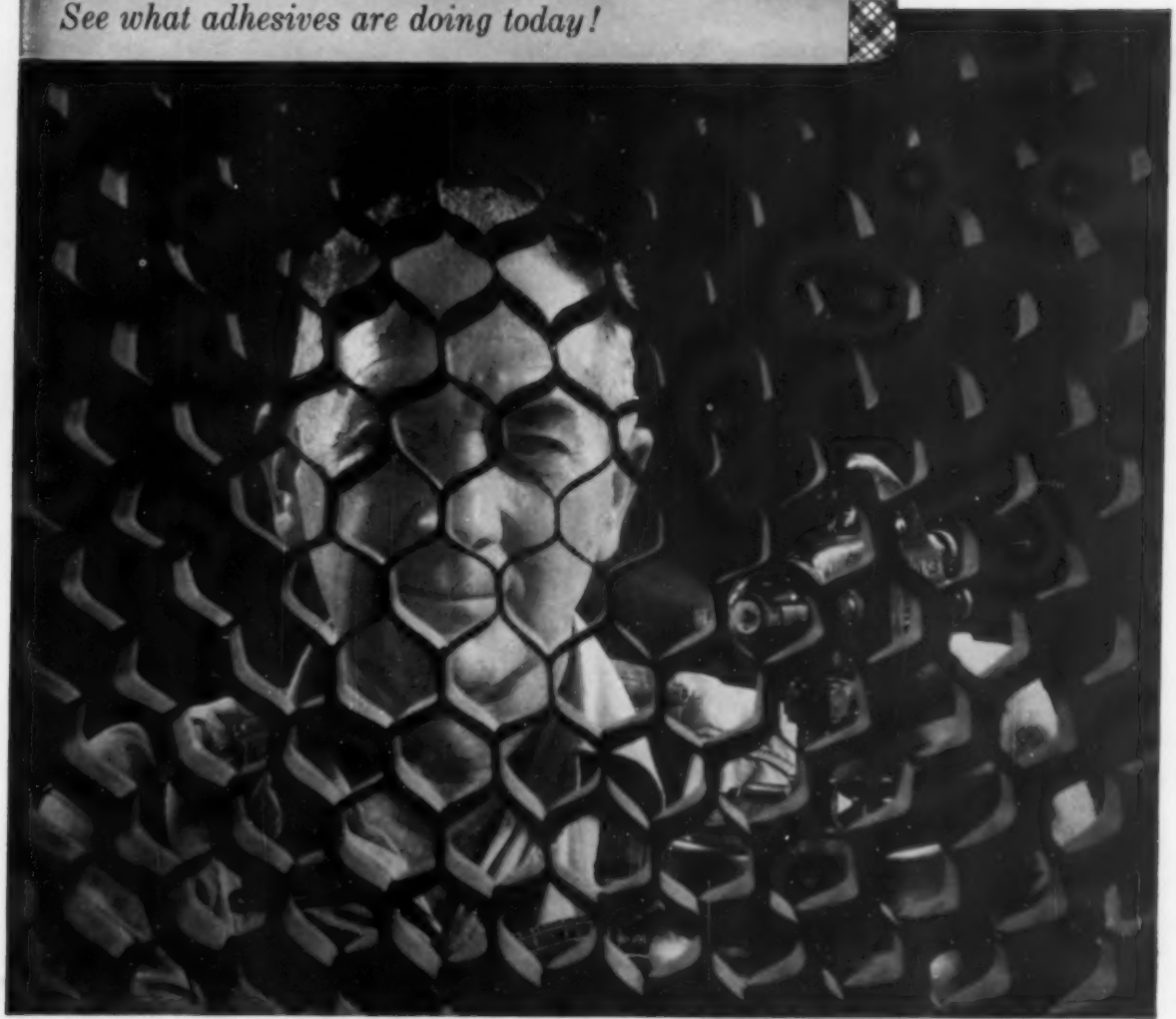


La Consolidada Concrete Reinforcing Wire Mesh As Used In Construction of Swimming Pool.

Sciaky Bros., Inc., 4930 West 67th Street, Chicago 38, Ill., POrtsmouth 7-5600

SCIAKY®

See what adhesives are doing today!



WHEN THIS MAN SQUEEZES THE TRIGGER, HE CUTS PRODUCTION COSTS. HIS SPRAY GUN IS LOADED WITH A MODERN ADHESIVE BY 3M.

Shooting holes in production costs

Every day this worker shoots holes in his company's manufacturing costs. The 3M adhesive in his spray gun creates a structural sandwich that's inexpensive, featherweight and strong. *Naturally this adhesive is a favorite with the comptroller.*

3M adhesives like EC-1357 and EC-1177 bond a honeycomb paper core between thin metal skins. They produce rigid, more durable units from such light materials because they're tougher, more flexible. Many industries benefit: building, furniture, aircraft, railroad equipment and others.

These 3M adhesives are specially designed for this sandwich construction, thoroughly tested. They apply fast and easily, like the hundreds of varied 3M adhesives for other uses.

SEE WHAT ADHESIVES CAN DO FOR YOU!

Consult 3M research. Contact your 3M Field Engineer. Or for information and free literature write on your company letterhead to: 3M, Dept. 63, 417 Piquette Avenue, Detroit 2, Mich.

PRODUCT OF 3M RESEARCH

3M ADHESIVES

ADHESIVES AND COATINGS DIVISION, **MINNESOTA MINING AND MANUFACTURING COMPANY**

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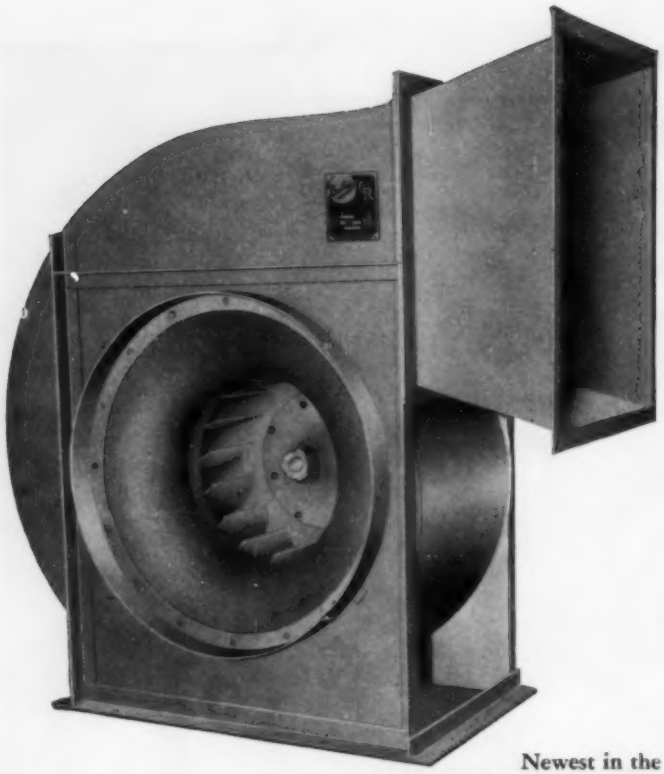


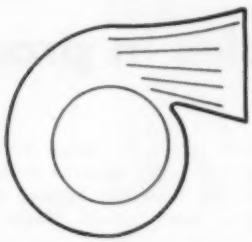
NEW

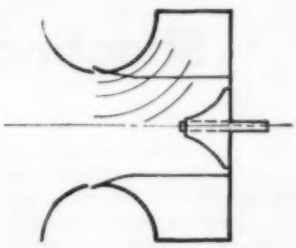
"BUFFALO" TYPE "CR" RADIAL BLADE FAN

Engineered for Your High-Volume High-Pressure Jobs

Newest in the complete line of "Buffalo" Fans, the Type "CR" offers high mechanical efficiency (above 78%) over a broad range, and has high-pressure, high-volume characteristics that make lower first cost possible on many applications. It is also highly suitable for handling dust-laden air efficiently.

In the illustration of the "CR" wheel, you will note the deeply pressed, curving flange. It provides rigidity and meets the curved inlet bell to form a true half-circle air entry path into the wheel (shown in cross section diagram). Wheel blades are radial at tip, curving smoothly forward at inlet. The streamlined housing with divergent outlet further minimizes abrasive effects and aids efficiency by reducing turbulence. While "Buffalo" builds other type fans of higher efficiency than the "CR", its highly desirable balance of favorable first cost, high efficiency and long life assure substantial overall savings in heavy industrial service. Write for new Bulletin FD 205 and see the "Q" Factor* features built into this quality fan.





**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

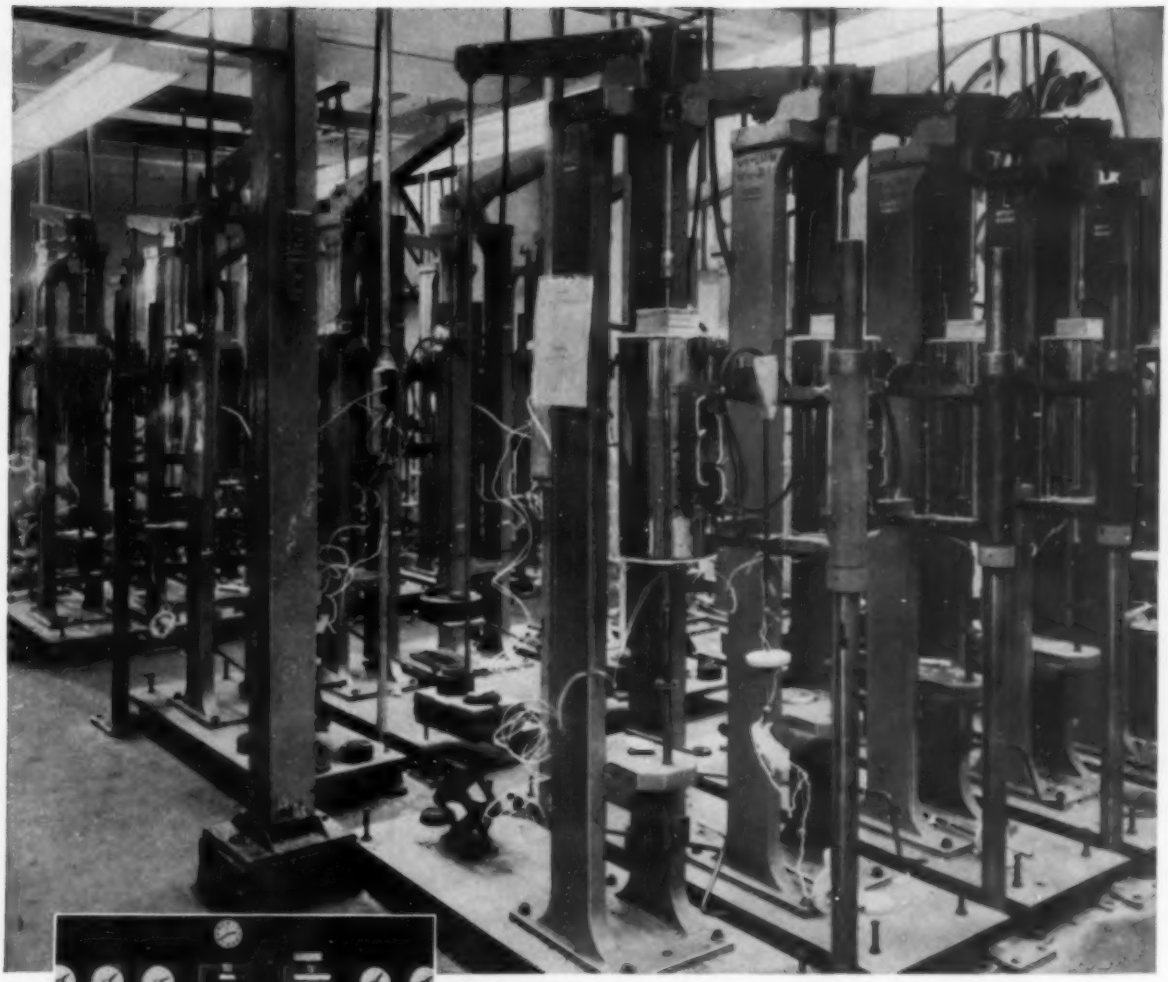
BUFFALO FORGE COMPANY

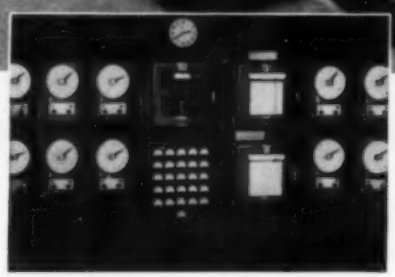
BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING





41 Speedomax® H Controllers Reduce Overshoot . . . Speed Recovery on Creep Rupture Machines

Here are only some of the creep rupture machines and Speedomax controllers at Wyman-Gordon, Worcester, Mass. To meet government specs for jet plane forgings made of titanium and special alloy steels, Wyman-Gordon has installed 2 banks of creep rupture testing furnaces with space-saving Speedomax H proportioning control. This combination assures them of quality control on a production basis . . . permits them to turn out part after part which will meet the stresses induced in jet propelled aircraft.

To keep production moving, Speedomax H D.A.T. control enables operators to bring furnaces up to temperature in minimum time. Rate of approach, in most cases, eliminates overshoot . . . speeds recovery time after sample change. By continuously regulating heat input in proportion to furnace needs, this Speedomax H control holds temperature of furnaces within ±2 F and in addition, eliminates the need for manually readjusting auto transformers.

Additional instrumentation includes four multiple-point Speedomax G recorders for each bank of furnaces, and 80-point and 76-point Model D Speedomax G indicators for checking furnace temperatures at any time from a central location.

Why not investigate Speedomax H when installing your next heat treating furnace—whether it's electric or fuel-fired, continuous or batch. A phone call or letter to your nearest L&N office —or to 4957 Stenton Ave., Phila. 44, Pa.—will bring you more information.

LEEDS & NORTHRUP
Instruments — Automatic Controls • Furnaces

like to be pampered?

. . . you will be on *special steel* service at your convenient, dependable, nearby Crucible warehouse. It's part of a nationwide chain set up to serve you *fast* and *well.*

For any *special steel,* in any quantity, call Crucible — *big enough to serve you, small enough to want to.*

Stocks maintained of:

Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting Die and Plastic Mold Steel, Drill Rod, Tool Bits, and Hollow Tool Steel Bars) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . Max-el, HY-Tuf, AISI Alloy . . . Onyx Spring, Hollow Drill Steel and other special purpose steels.

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Crucible Steel Company of America

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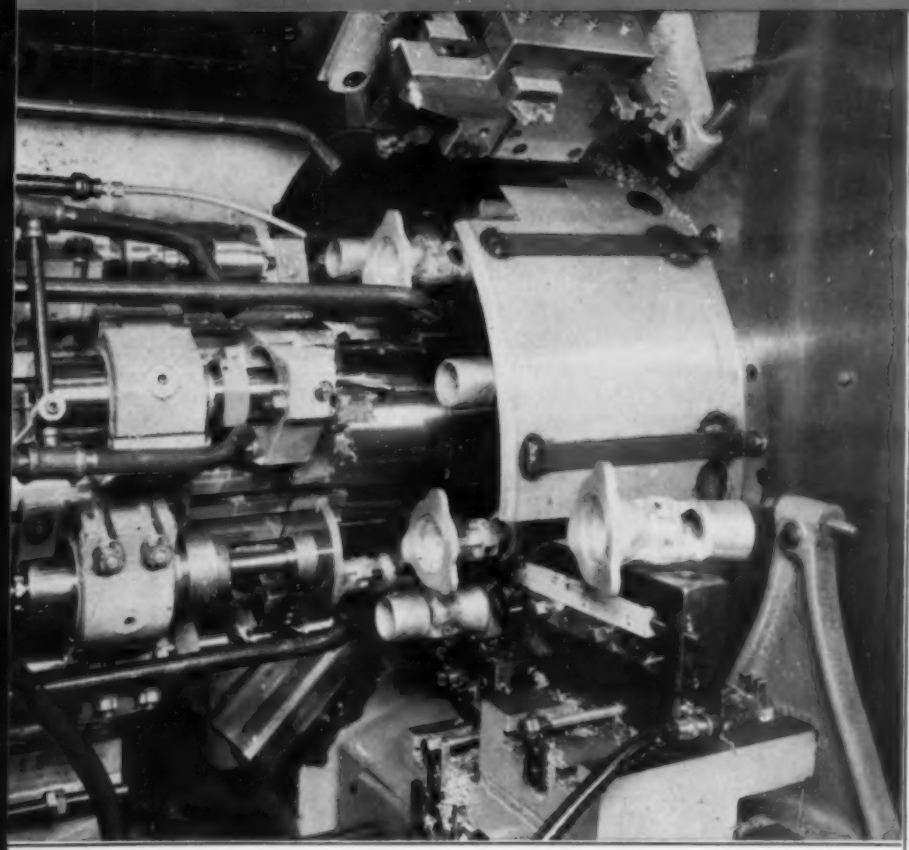
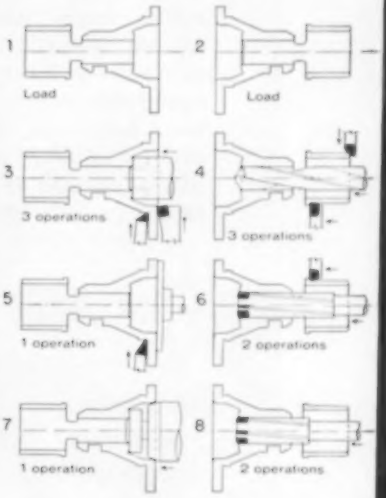
Acme-Gridley

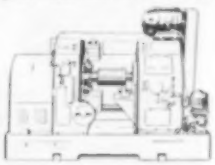
RPA-8 SPINDLE CHUCKER



BASKET HUB
ALUMINUM DIE CASTING
Double indexing—both ends completed at one setup on 6" RPA-8 Acme-Gridley Chucking Automatic.



12 operations in 13 seconds



SPEEDS PRODUCTION . . .

eliminates special machine investment

When it became necessary to replace the special machine on which this washing machine basket hub had been produced, the production engineer chose an Acme-Gridley eight spindle chucker. His choice was based on two factors: lower initial investment than that required by the special machine; greater adaptability of the Acme-Gridley with proper tooling to handle many such jobs that otherwise would require special equipment.

Acme-Gridley 8-spindle automatic chucking machines give you maximum production at lowest cost per piece because of greater tooling flexibility, double indexing that permits finishing both ends of the piece at one time, and comprehensive tooling engineering that comes only from COMPLETE LINE experience.

Write today for
Bulletin Nos. CM-44 and CM-51A

INDEX . . . to lower machining costs . . .
with *Acme-Gridley*
CONTROLLED CYCLE

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You Get MORE

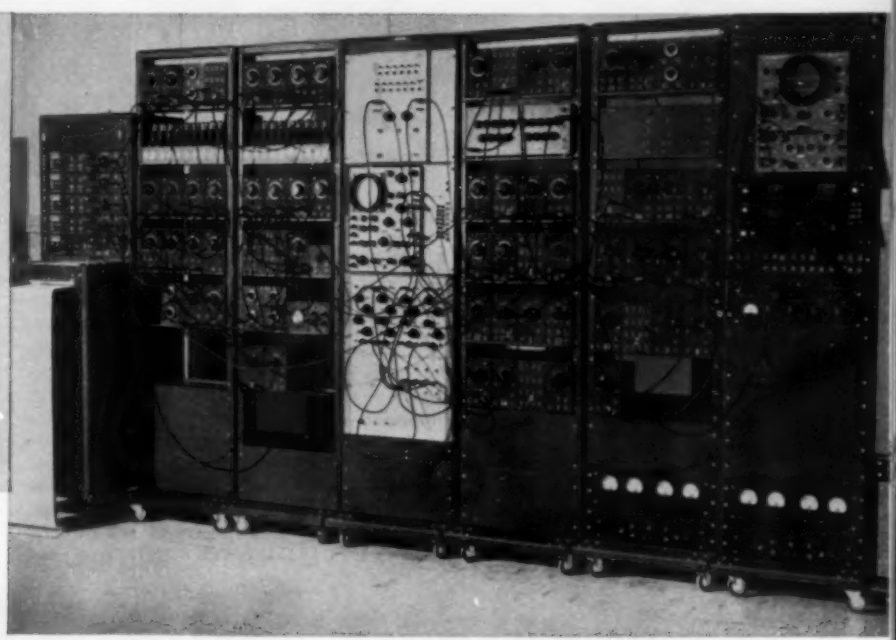
...because ALLIS-CHALMERS "COORDINEERS" the Entire System

EFFECTIVE regulation is more than a matter of good regulator design. It embraces overall *system* design... the integration of interdependent components — generators, exciters, motors, regulators and other control equipment. As manufacturers of a most diversified line of electrical generation, distribution and utilization equipment, Allis-Chalmers, of course, is in a unique position to provide this practical approach to mill regulation.

Allis-Chalmers maintains separate departments, staffed by research, design, manufacturing and application specialists for each product. "Coordineering" results from an interdepartment exchange of ideas and technical information correlated in *one* department specializing in metal producing industry application. In this department, components are matched to meet the requirements of your job. Responsibility for *system* performance rests with one company.

Analytical Facilities Utilized...

System performance is simulated in the computers to get optimum configuration of components. Time constants and exciter ceilings necessary for desired response are established.



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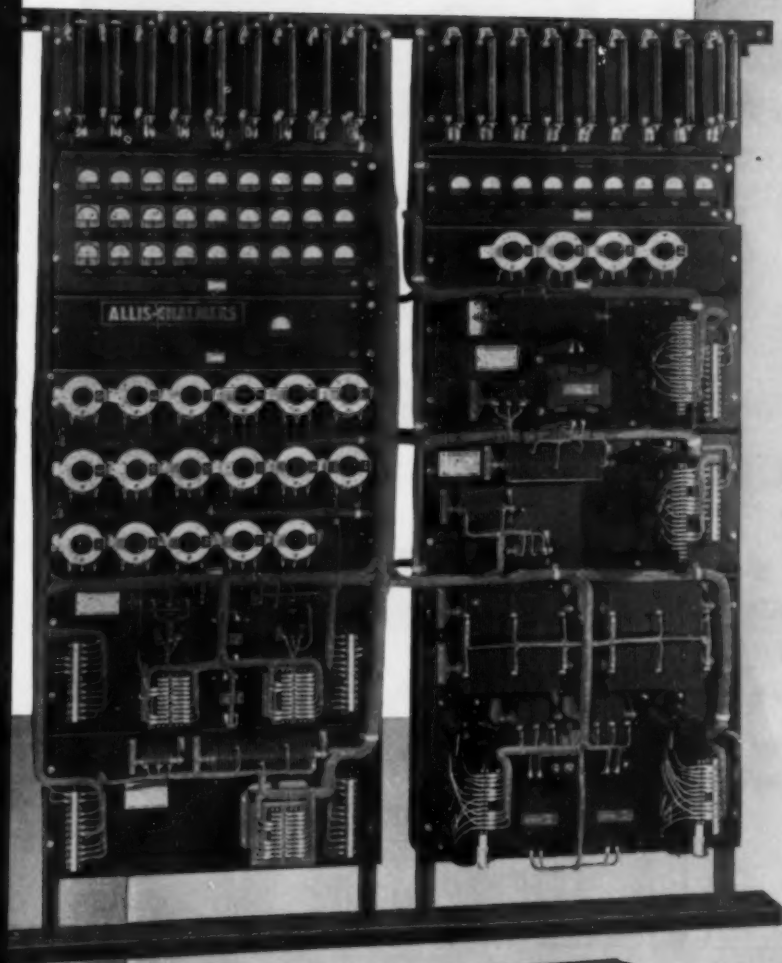
Regulex is an Allis-Chalmers trademark.

ALLIS-

STEEL

Efficient Regulation

ALLIS-CHALMERS
Regulators



For MILL CONTROL

Three Types Available

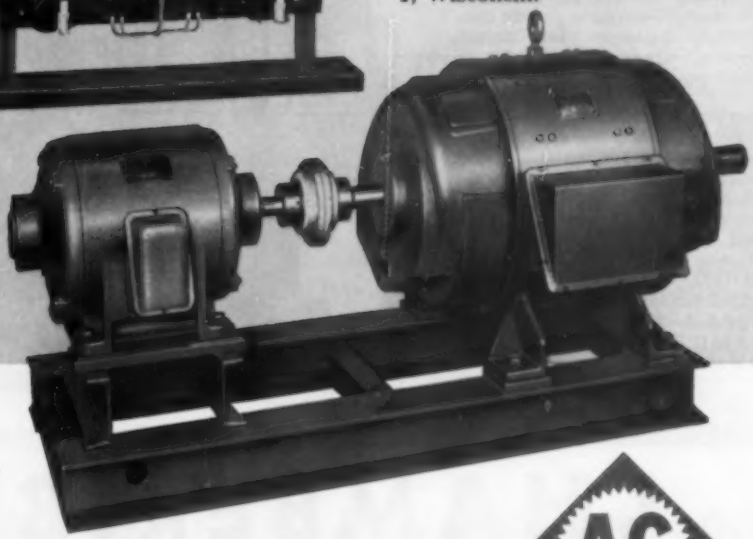
1 ***REGULEX* Rotating Amplifier** — Applicable where high power levels for reversible output are desired.

2 **Magnetic Amplifiers** — Applicable where low power levels for reversing or high power levels for non-reversing are desired.

3 **Combinations of Rotating and Magnetic Amplifiers** — Each complements the other for maximum regulating efficiency.

Get all the facts. See your Allis-Chalmers representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Magnetic Amplifiers



Regulex Rotating Amplifier

CHALMERS

A-C ALLIS-CHALMERS

A-5030

CHAMBERSBURG FORGING HAMMERS

BUILT TO HANDLE THE TOUGHEST FORGING JOBS—PROFITABLY!

Sixty years of forge shop experience form the background for the engineering that has designed and built these hammers. From every angle—efficiency, alignment, safety, maintenance and long life—Chambersburg Model "L" Hammers have no equal. The economy of the applied power and the efficiency of the heavy anvil combine to make Model "L" Forging Hammers the lowest cost, most productive tools of their kind.

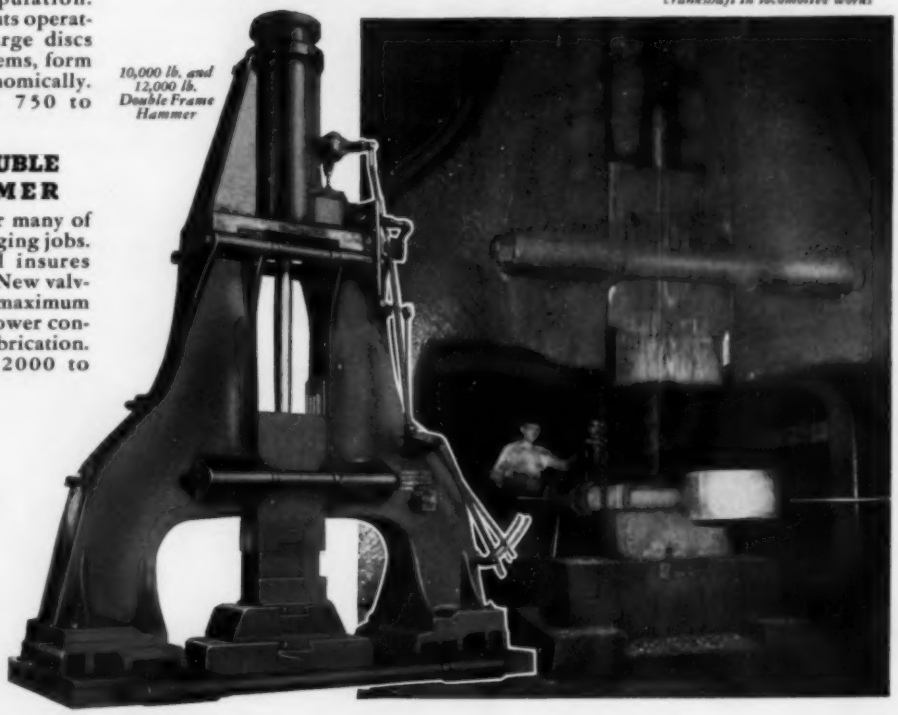
5000 lb. and 6000 lb. single High Frame Hammer

1500 lb. Chambersburg Single Frame Hammer in shipyard forge shop

12,000 lb. Double Frame Hammer forging crankshaft in locomotive works

MODEL "L" SINGLE FRAME HAMMER

Greater capacity to forge today's tougher steels. High frame provides larger working space. Specially designed forged alloy steel dies ease stock manipulation. Power saving cylinder cuts operating costs. Can forge large discs and rings, upset high stems, form arch bars, etc., most economically. Standard sizes from 750 to 6000 pounds.



10,000 lb. and 12,000 lb. Double Frame Hammer

MODEL "L" DOUBLE FRAME HAMMER

Large working space for many of the special or routine forging jobs. Heavy 15:1 ratio anvil insures more forging per blow. New valving system results in maximum blow energy—reduces power consumption. Automatic lubrication. Standard sizes from 2000 to 24,000 pounds.

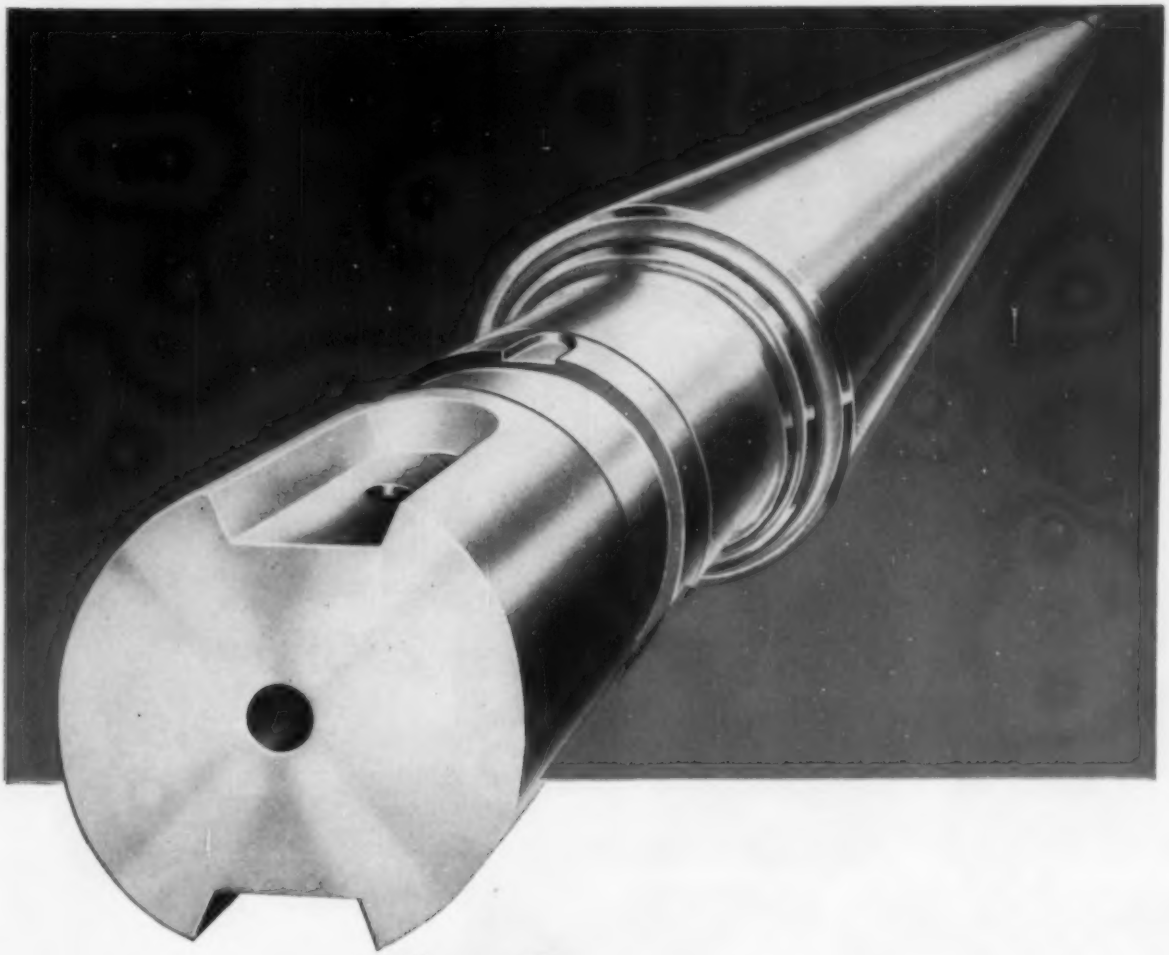
Chambersburg Model "L" Forging Hammers have been proven in service in forge shops around the world. For further information about them write for Bulletin No. 1-L-4—"MODEL 'L' HIGH FRAME HAMMER" or No. 39-L-4—"DOUBLE FRAME FORGING HAMMERS."

CHAMBERSBURG

THE HAMMER BUILDERS

Builders of THE IMPACTER "FORGING IN MID-AIR"

CHAMBERSBURG ENGINEERING CO. • CHAMBERSBURG, PA.



precision...

One of the unseen extra values you get in every NATIONAL ROLL

Yes, precision is an unseen value, but a very important one in roll production, because you must have precision machined rolls to give your customers precision and uniformity in rolled metals.

That's why National has always given such close attention to producing and machining rolls to exact specifications and close tolerances . . . and today, more than ever before, as a division of General Steel Castings, National has modern facilities plus additional metallurgical experience of the parent organization to give you rolls that will more than meet your expectations. Try National rolls and see.

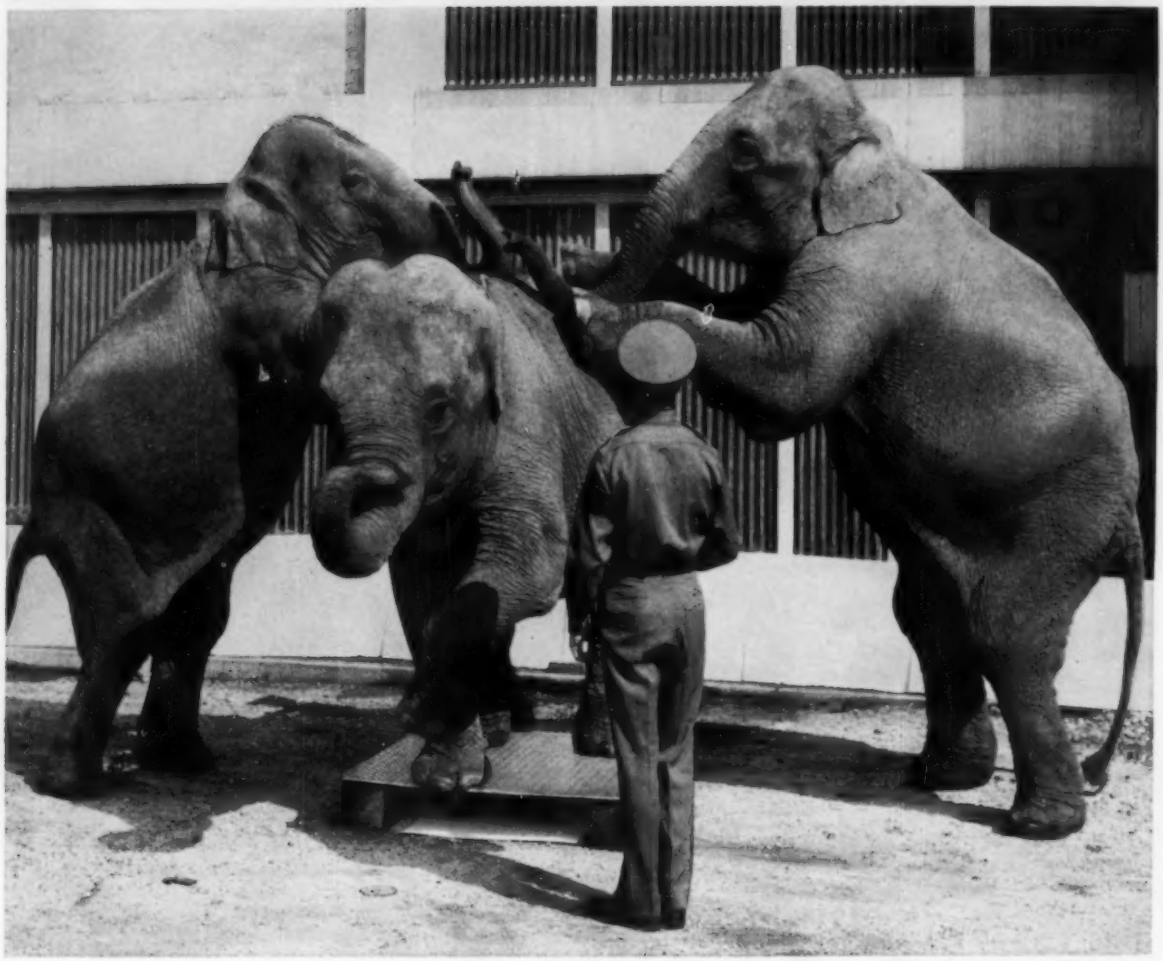
NATIONAL ROLLS

GENERAL STEEL CASTINGS CORPORATION

NATIONAL ROLL & FOUNDRY DIVISION

Avonmore (Westmoreland County) Pennsylvania

General Steel Castings Corporation: General Offices, Granite City, Ill. • Plants: Granite City, Ill.—Eddystone, Pa.—Avonmore, Pa.



2-TON BABIES PROVE 4-WAY'S STRUCTURAL STRENGTH

These frolicsome 2-ton circus babies demonstrate the ability of Inland 4-WAY Safety Plate to support tremendous weights. Because of 4-WAY's rugged strength, this 4′ x 4′ plate bears up under 4,000 pounds of pudgy pachyderm without a hint of strain.

The extreme structural strength of Inland 4-WAY Safety Plate is an important factor in plant safety. 4-WAY is not just another flooring surface material, but a steel plate that can be used as a structural member.

Strength, however, is only one of the advantages that 4-WAY offers. Its **slip-resistance, durability, attractive appearance, ease of application, fire resistance, ease of fabrication and cleanability** provide you with a combination of features unequalled by any other materials. Where can *you* use Inland 4-WAY Safety Plate? There are dozens of places in every plant where it can pay off in man hours saved . . . in providing safer, cleaner surfaces . . . in boosting general efficiency. For helpful suggestions and useful information, write to Dick Prendergast, Room 1262.

INLAND 4-WAY® SAFETY PLATE

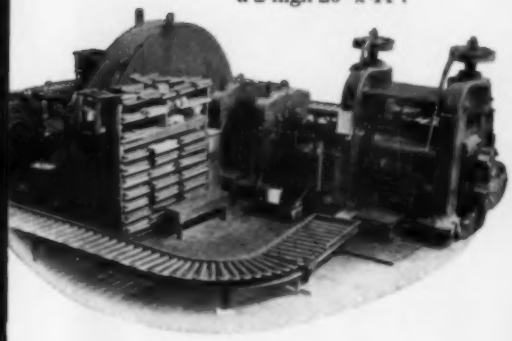
INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport St. Louis • Kansas City • Indianapolis • Detroit • New York

BEFORE

Falco's #5 mill, as it looked before modernization. It is a 2-high 20" x 44".



AT FAIRMONT ALUMINUM

Same mills... big differences

Without running any faster, this line of cold mills has 20% greater capacity, thanks to BLISS modernization

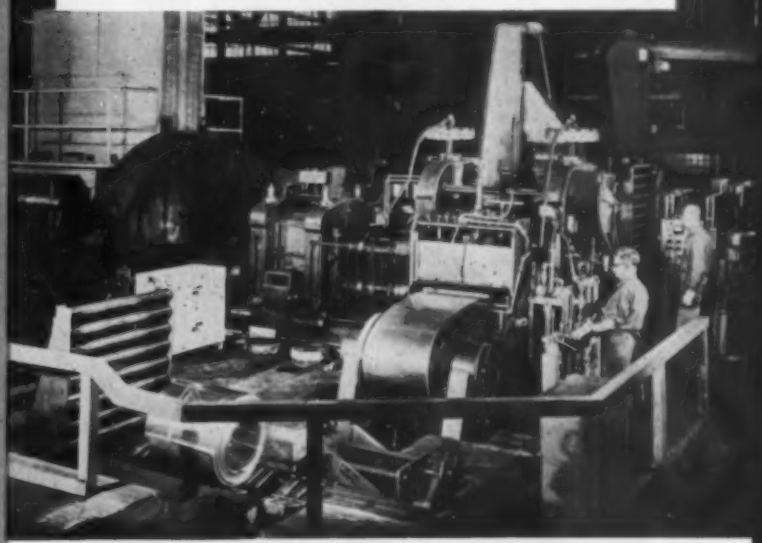
RESULTS

Here's what Fairmont Aluminum reports about its Bliss-modernized mills:

- Output is up 20% and will go higher as the plant completes other installations, such as new annealing facilities.
- Coil handling is far easier. Surface damage to the strip has been eliminated. And finish has been improved by the new roll-coolant systems ... Fairmont Aluminum formerly dry rolled.
- Thanks to the new Bliss tension reels, reduction per pass on each mill has been increased 12% or more. Former maximum was 20%.

AFTER

The same mill, as it looks today. The entry and delivery equipment has been replaced with Bliss cone-type payoff reel, tension reel, bridle unit, belt wrapper, coil buggies and upenders. The strip is accurately centered in the work rolls, and it is a simple matter to hold gage, always a problem with the old equipment. This mill is used for secondary breakdown, rolling strip in thicknesses between 0.125" and .025" and in widths to 38". Similar Bliss equipment was also added to Mill #6, used for secondary breakdown and finishing of narrower strip. Another improvement involves new motorized screwdowns presently being manufactured by Bliss.



Mill #7 is a 16" x 30" used for finishing to gages as thin as .006". It has a Bliss mandrel-type payoff (shown here), bridle feed, tension reel and roll-coolant system.

New 28" Bliss slitting line takes up to 12 cuts in 0.020" material at speeds up to 600 fpm. Bliss also revamped the plant's 36" slitting line, equipping it with tension reel, mandrel-type payoff and coil buggy.

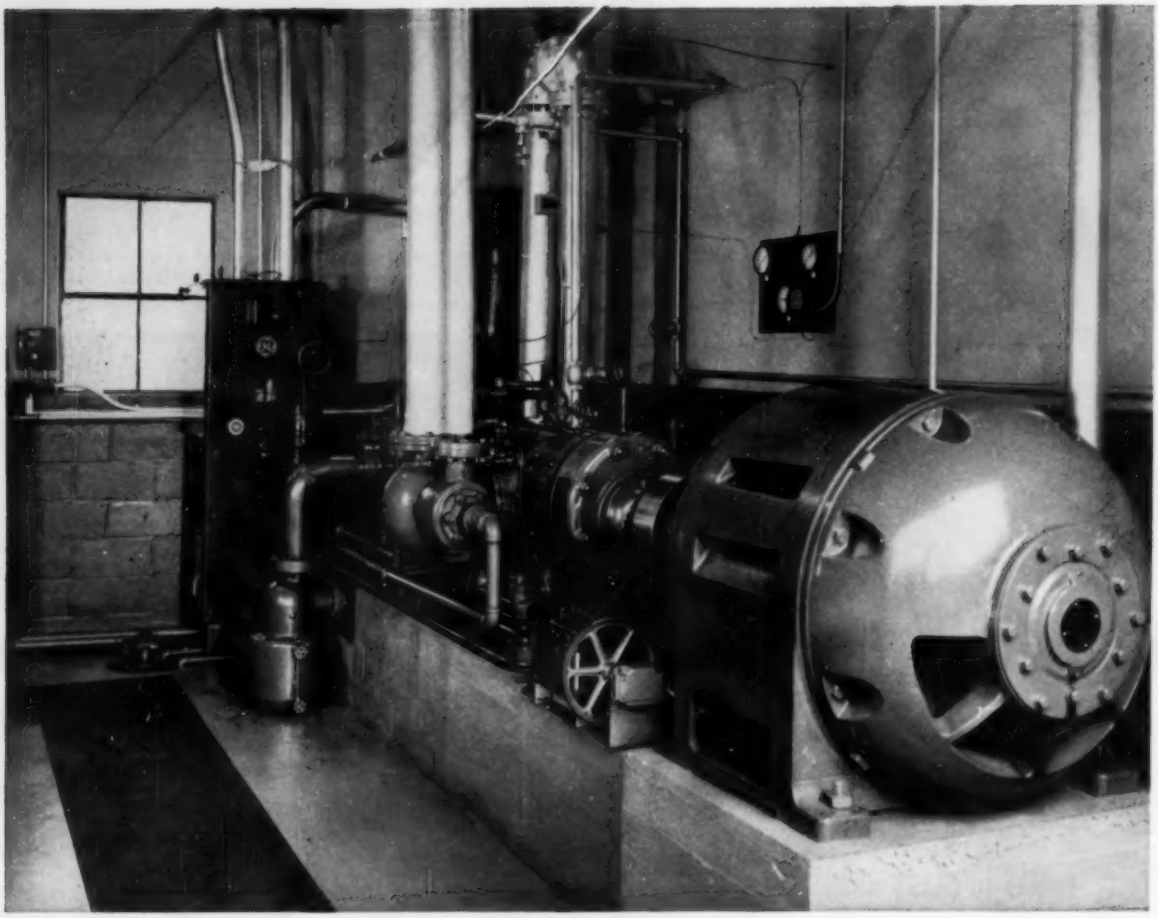
If you are contemplating improvements or modernization, it will pay you to consult Bliss Rolling Mill Division engineers. For details of typical Bliss installations, write today for a copy of the 60-page Bliss Rolling Mill Brochure, Catalog 40-A. It's yours for the asking.

BLISS
SINCE 1857 ®

is more than a name...
it's a guarantee

E. W. BLISS COMPANY
General Office: Canton, Ohio
ROLLING MILL DIVISION, Salem, Ohio

PLANTS: Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; Pittsburgh and Midland, Pennsylvania; San Jose, California. *In Europe:* E. W. Bliss (England) Ltd., Derby; E. W. Bliss Co., (Paris), France.



Fuller Rotary Two-Stage Compressor, C135-135H. Capacity 680 c.f.m., 100-lb. pressure, 690 r.p.m., 150 hp. motor.

16,000 HOURS OF OPERATION WITH NO MAINTENANCE

Empire Steel Castings, Inc., Reading, Pennsylvania, installed a C-135-135H Fuller Rotary Two-stage Compressor in April 1953. After 32 months—approximately 16,000 hours of operation—the compressor received a routine inspection, when a new set of blades was installed in the higher-pressure cylinder.

The Empire engineers report no down-time since replacement, although they've added 4,000 operating hours. Prior to switching to Fuller, their former experience with compressors was a different story—as many as several overhaulings in one year. With Fuller equipment furnishing a constant high capacity air supply, production costs have been greatly reduced.

Here's how Empire uses compressed air:

- In the molding department, supplying all air for pneumatic rammers, all squeeze and jolt machines, automatic set-out and lifting apparatus of mold conveyors, automatic shake-out machines, mold cleaning and spraying equipment.
- In the core department, for ramming equipment, spraying and torch drying equipment, core oven operation as well as core blowing equipment.
- In the cleaning department, pneumatic chipping hammers and grinders, blacksmith requirements, sand-blasting, pressure testing and miscellaneous tools.
- In the heat-treating department, heat treating furnace operation and cooling equipment.

To get all the facts and engineering data, write today for Bulletin C-5A.

C-298
3682

FULLER COMPANY
160 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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Fuller

PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

HILL Sheet Grinder and Polisher with reciprocating hydraulic table processing individual sheets.

HILL

GRINDING and POLISHING MACHINES

How much is it costing you to produce ACCEPTABLE finishes on FLAT surfaces

HILL Pinch Roll Grinder and Polisher for "Wet" or "Dry" operations. (Shown in series for straight line production)

HILL 2-Roll Vertical Abrasive Belt Grinding and Polishing machines are the logical result of 25 years of research and experience in producing self contained units for successfully processing ferrous and non-ferrous sheets. We have consistently proven that wide abrasive belt grinding and polishing equipment must incorporate these fundamental features — rugged construction, simplicity of design, accessibility, versatility and centralized controls.

HILL abrasive belt polishing machines are recommended for continuous operation and insure lower production costs with superior finishes as required today by the manufacturers of decorative plastics, food processing equipment, automobile bumpers, lithographers and photo engravers plates, home appliances, etc., etc.

Both types of machines are normally built up to 60" wide, and larger capacity equipment can also be furnished.

Your inquiries are solicited for detailed information and recommendations.

HILL ACME TOOLS FOR INDUSTRY

THE HILL ACME COMPANY

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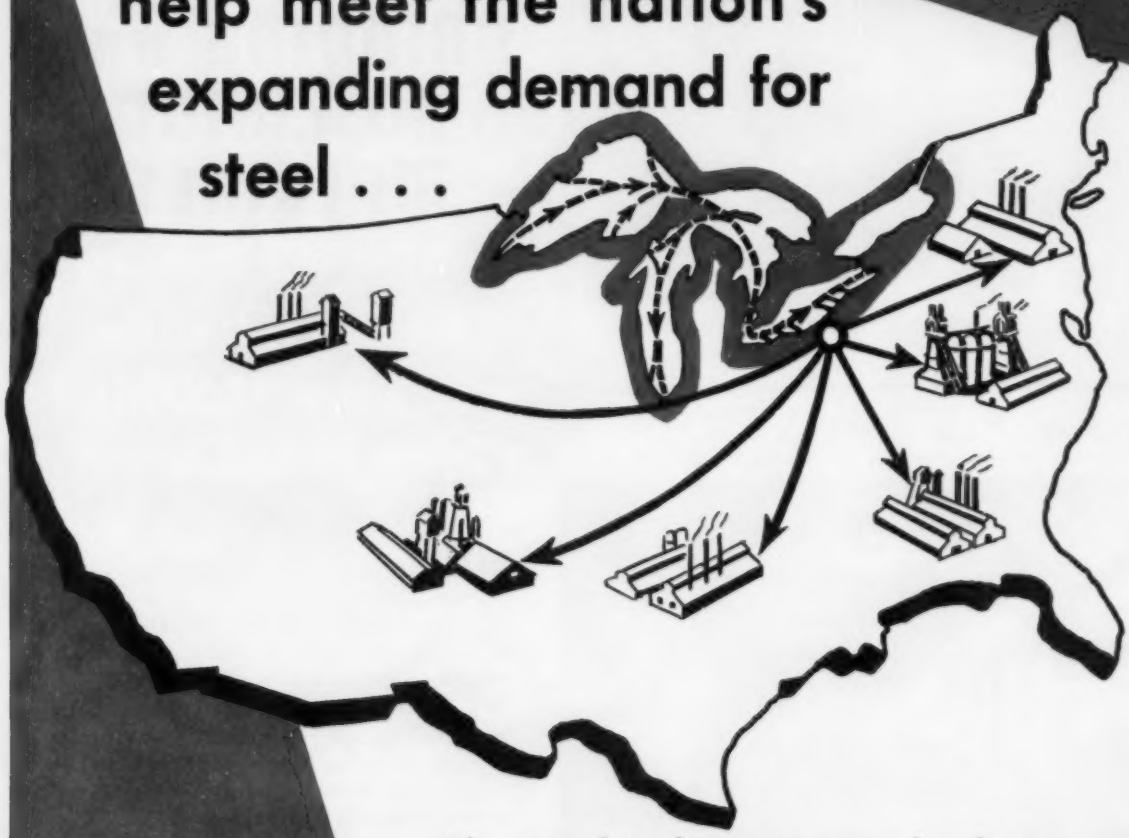
"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

CLIFFS *High Grade Ores*

help meet the nation's expanding demand for steel . . .



The steel industry grows by leaps and bounds, as living standards improve and the population increases, and Cliffs high grade iron ores help the steel industry meet the expanding demand for steel.

CCC

LAKE SUPERIOR IRON ORES OF OUTSTANDING UNIFORMITY
• VESSEL TRANSPORTATION • FERRO ALLOYS • COAL

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

Now-COLD BENDING THE "PINES-WAY" PRODUCES MORE ACCURATE AUTOMOBILE FRAMES

View of Pines Production Bender, one of 28 in large plant, forming 5th bend in frame side rail. Tube is 4"x4½"x.090 formed to a 38° angle on a 17½" I.R.

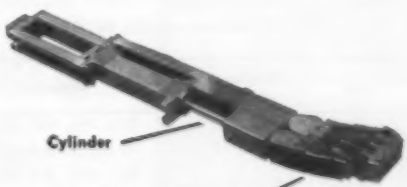
▲ Close-up view of machine used to produce 4th bend in long side rail member. Five different bends are made in this piece, each in sequence on separate machines. Accuracy is held within .030" to .045" at seven check points. Spring-back is easily controlled by simple stop settings — an important factor that cuts tool costs.

Production Bending Methods Simplify Fabricating Problems, Cut Assembly Costs

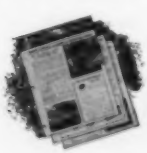
● The unusual versatility of PINES Bending Machine methods is again demonstrated by the successful production line application shown above in a large plant manufacturing automobile frames. Proven by more than eighteen months of operation, a battery of twenty-eight special PINES Benders are now forming tapered welded steel tube frame members at a rate of 120 bends per hour. These machines with their ingenious tooling — designed, developed, and built by PINES — form seven bends in each side rail member and produce more accurate parts than ever before possible. The end result is a stronger, more accurate chassis that greatly reduces body assembly problems.

Typifies Progress in Cold Bending Techniques

This revolutionary new manufacturing method is the result of long months of cooperative efforts between Pines and automotive engineers. It is typical of the consistant progress being made in profitable application of cold bending in the manufacture of a wide variety of metal products. It may also pay you to investigate the design possibilities and the production advantages of cold bending the "Pines-way." At your first opportunity call in our Sales Engineers for free survey.



▲ View of a flexible articulate mandrel used for making a bend at a right angle to, and within, a previously bent section. Mandrel is automatically inserted and expanded. Insures smooth, neat bends.



Write FOR MORE DATA

If you would like case study data on production bending, write today for free copies of Pines News.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery · 662 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

Now—Cleveland provides a single source for all your socket screw requirements

Simplifies specification, cuts paper work, speeds delivery

CLEVELAND STANDARD SOCKET SCREW PRODUCTS
UNIFIED THREADS—CLASS 3A FIT

Type	Standard Sizes (diam.)	Material
Socket head cap screws	#0 to 1½ in. (larger sizes avail.)	Alloy steel, heat treated or Nonmagnetic 18-8 stainless
Set screws (cup, half dog, flat, cone or oval points)	#0 to 1 in. (#0-#3, cup point only)	Alloy steel, heat treated or Nonmagnetic 18-8 stainless (to ½ in., cup point only)
Flat head socket cap screws	#4 to ¾ in.	Alloy steel heat treated
Button head socket cap screws	#4 to ⅝ in.	same
Shoulder screws (stripper bolts)	¼ to ¾ in.	same
Dowel pins	⅛ to 1 in. (nominal size and .001 in. oversize for repair)	same
Pressure plugs	⅛ to 1¼ in. NPTF	same
Socket screw keys	.028 to 1 in. across flats; short or long arm	same

Cleveland has expanded its socket screw line to provide a single source for all your socket head needs.

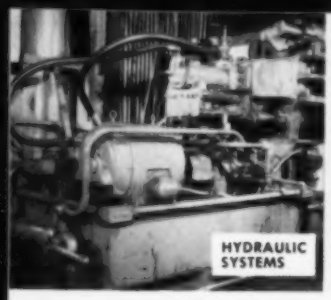
At the same time, and in conjunction with opening its new plant, Cleveland is doubling its factory warehousing capacity. This, plus the latest materials handling equipment, will enable Cleveland distributors to get same-day shipment of your larger orders.

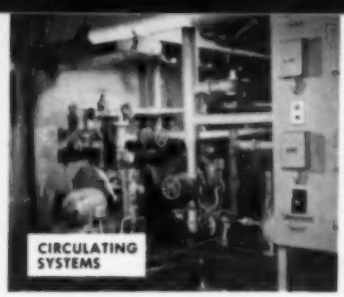
Included in the expanded Cleveland socket screw line are precision dowel pins. While not a socket head product, they are basic fasteners for the important tool and die industry, where they are closely associated with socket head cap screws and shoulder screws. We offer them as part of a complete service.

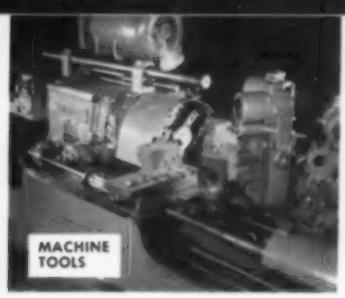
Cleveland socket head cap screws are upset forged from heat-treated alloy steel. This results in symmetrical, unbroken grain structure in heads, threads and fillets—greater fatigue and tensile strength, stronger fasteners.

Write for latest literature and technical data. Then see your local Cleveland Cap Screw distributor for all your socket screw requirements.

THE CLEVELAND CAP SCREW COMPANY
4444-2 Lee Road, Cleveland 28, Ohio







SUN SOLNUS OILS IDEAL LUBRICANTS FOR 80% OF ALL APPLICATIONS

Moderately priced...low in carbon-forming tendencies, Sun Solnus® oils simplify your storage problems by doing with *one oil* many jobs that would otherwise require *several.* Their ability to protect metal parts against corrosion, their resistance to oxidation, and their moderate price all add up to "more lubrication per dollar."

For technical information, see your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-51.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

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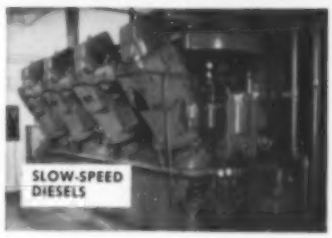

Valve on left is from compressor run for 3,000 hours with well-known, high-grade oil. At right is same valve after a 3,000-hour run with Sun Solnus oil. Note difference in carbon deposits.

3000-HOUR TEST PROVES SUN SOLNUS OILS REDUCE CARBON BUILD-UP IN COMPRESSORS

Equipment: A three-stage Norwalk horizontal-type compressor. Operating pressure: from 1,000 to 1,500 psi.

Test: The compressor was cleaned thoroughly and filled with a well-known, high-grade oil. The equipment was run for 3,000 hours, then torn down for inspection and cleaning. Then Solnus® 300 was tested in the same way.

Results: Look at the two pictures. You can see for yourself how Solnus oil reduced dangerous carbon build-up.

All types of reciprocating air compressors that have been changed over to a Sun Solnus oil show similar results. A test in your compressor will show the same remarkable reduction of carbon deposits.

You can get a technical bulletin about Sun Solnus oils by asking your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-52.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

"Warco PRESSES ...Stand up!"

Tongue support part for New Holland baler, prepared with 75-ton Warco inclinable punch press, is shown fitted in place on Hayliner 68 assembly line at New Holland, Pa. Inspecting the job is Sub-assembly Foreman Lee Larkin.

"Not a breakdown in five years," says leading farm machine manufacturer

• Several years ago New Holland Machine Company, New Holland, Pa., purchased their first Warco Press . . . an inclinable punch press. It is still working as good as the day they bought it. Since then they have added other Warcos for piercing, blanking and forming a variety of machine parts. "We find these presses very satisfactory," say New Holland officials; "in our five years of using Warcos we have never had a breakdown."

Warco Presses stand up because they are built from the frame out to deliver maximum performance in the most difficult assignments.

THE FINISHED PRODUCT . . . Warco inclinable punch press had a hand in turning out this smart-looking, smooth-performing Hayliner 86 baler. The machine was designed to bring the average-size farm big baling capacity at smaller baler cost.

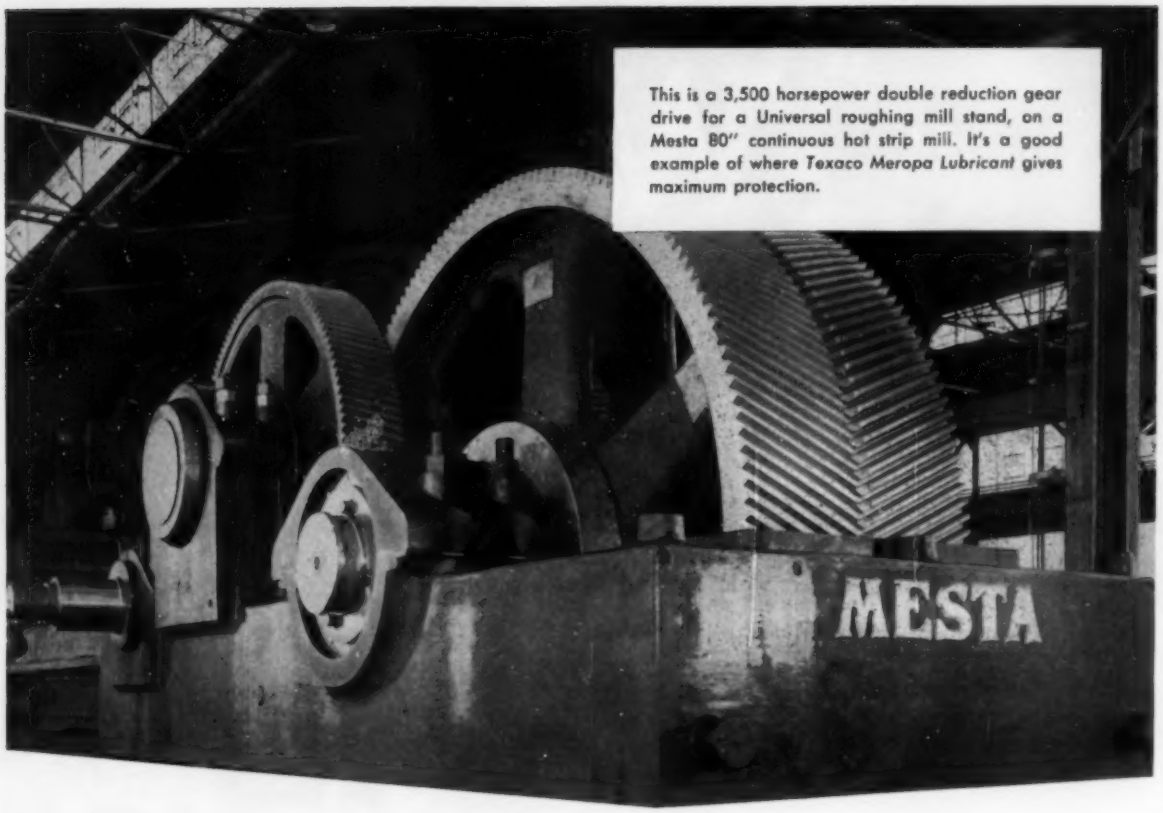
Using a 75-ton Warco inclinable punch press, operator Christian Good turns out tongue support parts. Watching the operation is Assistant Foreman Lester Howe. Ten-gauge hot-rolled sheet steel is used for the part.

Federal® WELDERS

The Federal Machine and Welder Company

WARREN, OHIO

Warco® PRESSES



This is a 3,500 horsepower double reduction gear drive for a Universal roughing mill stand, on a Mesta 80" continuous hot strip mill. It's a good example of where *Texaco Meropa Lubricant* gives maximum protection.

POLAR ADDITIVES GIVE EXTRA PROTECTION TO COSTLY GEARS

Polar additives in *Texaco Meropa Lubricant* keep it adhering to gears under *all* operating conditions, including heat, pressure, severe moisture. *Texaco Meropa* has extreme pressure properties that give it a tougher lubricating film. It keeps gears working safely under extra-heavy or shock loads.

What's more, *Texaco Meropa Lubricant* resists oxidation and thickening, won't foam or separate—and it's non-corrosive. Result: Longer life for gears and bearings—less maintenance cost.

The *right* lubricant can save you money. The Texaco Lubrication Engineer in your area will help you do it. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

Metalworking Outlook

Productivity Slips

The nation's gains in productivity are slipping. The efficiency of men and machines rose only 1.5 per cent last year, according to government figures. The improvement averaged slightly better than 3 per cent annually from 1947 through 1955. What happened last year? Many areas of the economy, working at top pitch, used marginal workers and obsolete equipment. The spurt in capital plant and equipment spending last year and this one should make it unnecessary to use as much outdated machinery in the coming months. But the problem of marginal workers remains. Outlook for 1957: A recovery in the productivity gain to the customary 3 per cent.

Employment Rising

Some 92 million people may be employed in the U.S. by 1982, predicts Labor Secretary James P. Mitchell. Employment in February rose to 63,190,000, up 612,000 from January and reversing a decline in the number of jobholders that had been going on since last fall. Nonfarm employment hit 57,996,000 last month, more than 1 million above the February, 1956, figure.

Memo on the UAW

A campaign is under way to decertify the Federation of Honeywell Engineers as bargaining agent for 2000 professional and technical employees of Minneapolis-Honeywell Regulator Co. . . . FHE had voted to affiliate with the United Auto Workers. If the decertification move is successful, it will nullify a major UAW victory in its drive to increase white-collar membership . . . UAW's Walter Reuther hints that Chrysler Corp. can expect more strikes over work standards . . . UAW's biggest local, at Ford, is fighting the proposed 50-cent increase in union dues . . . The union's research director, Nat Weinberg, has been relieved from administrative duties to concentrate full time on the possibility of achieving the short week, the effects of automation on employment and how SUB plans can be expanded.

Joint Insurance Plan

Watch for the UAW to announce a new health and accident insurance program for small companies. The union has been working on a plan with a major insurance carrier to provide insurance to several small and medium firms as a joint program. Object: To increase health and accident coverage and benefits. Many firms, officials say, can't afford adequate insurance programs on their own. Under the joint program, companies will be able to secure better coverage for their insurance dollar, claims the UAW. Savings will stem from greatly reduced administrative costs under such a setup.

T-H Changes Proposed

Labor Secretary Mitchell's management-labor advisory committee has these three recommendations for Taft-Hartley revisions: 1. The National Labor

Relations Board should be allowed to certify collective bargaining agreements in the construction industry without elections where there is an historical background of bargaining. 2. Contributions to apprentice training funds should be permitted where the programs are jointly administered by management and labor. 3. Associations or other multiemployer groups should be permitted to bargain collectively. Chances are poor for any of these changes becoming law soon.

U.S. Shifts on Industrial Mobilization

The U.S. is shifting its ideas on defense mobilization. Even government experts don't agree on what some ambiguously worded sections of new Defense Mobilization Order VII-7 mean. An Office of Defense Mobilization official calls the whole thing "nothing tremendously different" from the old order issued in 1954. But from the Pentagon comes this view of another official: "It's an evolutionary step toward changing our mobilization base so that we can develop production capable of functioning despite nuclear disruption and damage." In the Pentagon man's opinion, the new order will mean emphasis on greater inventories of finished components, more spare parts for production equipment and more alternate assembly lines. Still obscure is the meaning (if any) that the order will have for the trigger program in machine tools.

Bethlehem Denies Indiana Plans

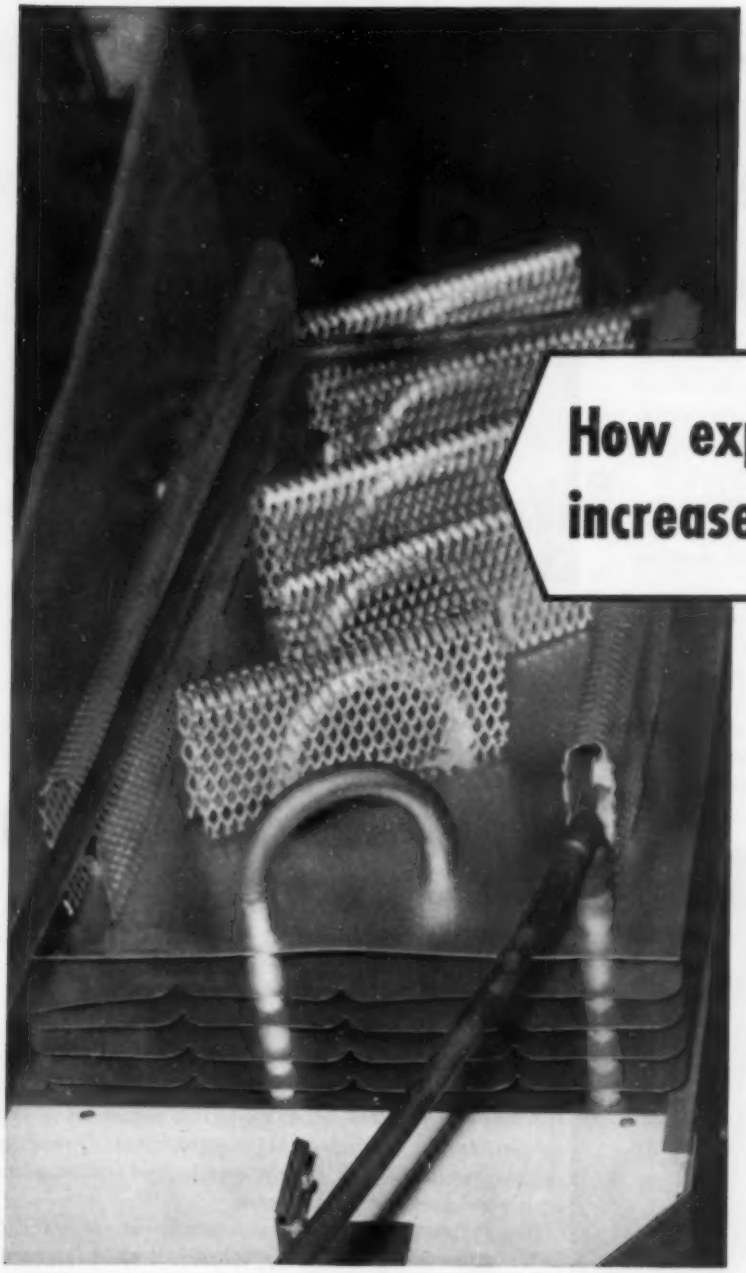
Bethlehem Steel Co. denies that it has immediate plans to build a new steel plant east of Gary on Lake Michigan's shore. It has purchased some 3500 acres in Porter county, Indiana, but says that plans for a plant are "dreams of the future."

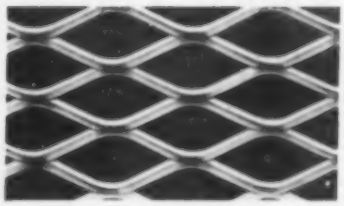
Trouble at AMC

Look for Financier Louis E. Wolfson to try to force American Motors Corp. to drop its auto lines and concentrate on Kelvinator appliances. He's probably the largest stockholder. Possible compromise: AMC will drop Nash and Hudson production but retain Rambler and Metropolitan cars (which have been doing well) and the appliances.

Straws in the Wind

Commercial and industrial failures climbed to 327 in the week ended Mar. 7, highest since the week ended Apr. 10, 1940 . . . Deliveries are speeding up, prices continue high, production is stable, order backlogs are declining, inventories slipping slightly, reports the Purchasing Agents Association of Chicago . . . January work stoppages, at 325, were the lowest for the month since World War II, except in 1948 and 1954 . . . Ford Motor's Edsel will be assembled at Mahwah, N. J.; Somerville, Mass.; Wayne, Mich.; Louisville; Milpitas, Calif.; and at a plant to be selected in the Los Angeles area.





How expanded aluminum increased coil efficiency

Anheuser-Busch, Inc., St. Louis, Mo., used Penmetal expanded aluminum in their freezing units to cover the exposed ends of the evaporator coils. This expanded aluminum provided additional prime surface for frost collection on the cooling coils and fins—thus increasing the efficiency of the unit.

But Anheuser-Busch found other advantages in expanded aluminum. Cooling air circulates freely through the open mesh . . . it won't rust . . . can't ever loosen . . . and was easy to shape.

Does the success of this manufacturer open your eyes to a new possibility for solving some problem of your own by using expanded aluminum? Write today, for a reference copy of booklet 507 EM. No cost or obligation.

Penmetal expanded aluminum used to cover exposed ends of evaporator coils in Anheuser-Busch refrigerator-merchandiser.

PENN METAL COMPANY, INC.

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Penmetal

PM-129

Armco ALUMINIZED STEEL
...Resists Combined Attack of Heat and Corrosion
...Directs and Saves Heat

Truck mufflers made of ALUMINIZED STEEL increased service life five times

Here's a typical example of the extra product life offered by Armco ALUMINIZED STEEL® Type 1 . . . the special steel that withstands destructive combinations of heat and corrosion:

A major truck fleet in Nashville, Tennessee, reports *five times longer service life* for mufflers made of ALUMINIZED STEEL than for carbon steel mufflers previously used.

Many products besides mufflers have also been improved by this special steel. Parts of heaters, furnaces, stoves and ranges—serving where heat and corrosive gases make short work of plain carbon steels—last longer when they're made of Armco ALUMINIZED STEEL Type 1.

Reflects radiant heat, too

The inner body of this rotisserie is made of Armco ALUMINIZED STEEL Type 1 because, up to 900 F, this aluminum-coated steel reflects about 80 per cent of the radiant heat that meets it. Many manufacturers design appliances to take advantage of this reflectivity as well as the high strength of ALUMINIZED STEEL. Depending on requirements, it may be used to hold heat in, or to direct heat where it's wanted.

If your products must resist combinations of heat and corrosion, or reflect heat efficiently, it will pay you to consider Armco ALUMINIZED STEEL Type 1. Call our nearest sales office or write us for full information at the address below.

ARMCO STEEL CORPORATION

1087 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

How Are Your Profits?

A few days ago we asked the head of a large metalworking company about his company's progress and its problems. Call him Mr. Metalworking.

At the outset, he was enthusiastic. Sales had doubled in the last eight years. He believes they will double again in the next eight. Order backlogs are the highest in the company's history. New plant capacity is being added to provide for the additional business expected in the years ahead.

Then we asked Mr. Metalworking about profits, and his enthusiasm faded. Sales increased 20 per cent in 1956, he said, but profits went up only 2 per cent. Sales also increased more than profits in 1955.

The number of pennies his company is able to keep out of each dollar of sales is shrinking steadily. In 1956, it kept only 5.3 cents—a half cent less than it did in 1955, a full cent less than it did in 1954.

Mr. Metalworking is finding that a high level of sales does not automatically make for a healthy financial situation. So he's asking all his management people to turn their attention to profit improvement.

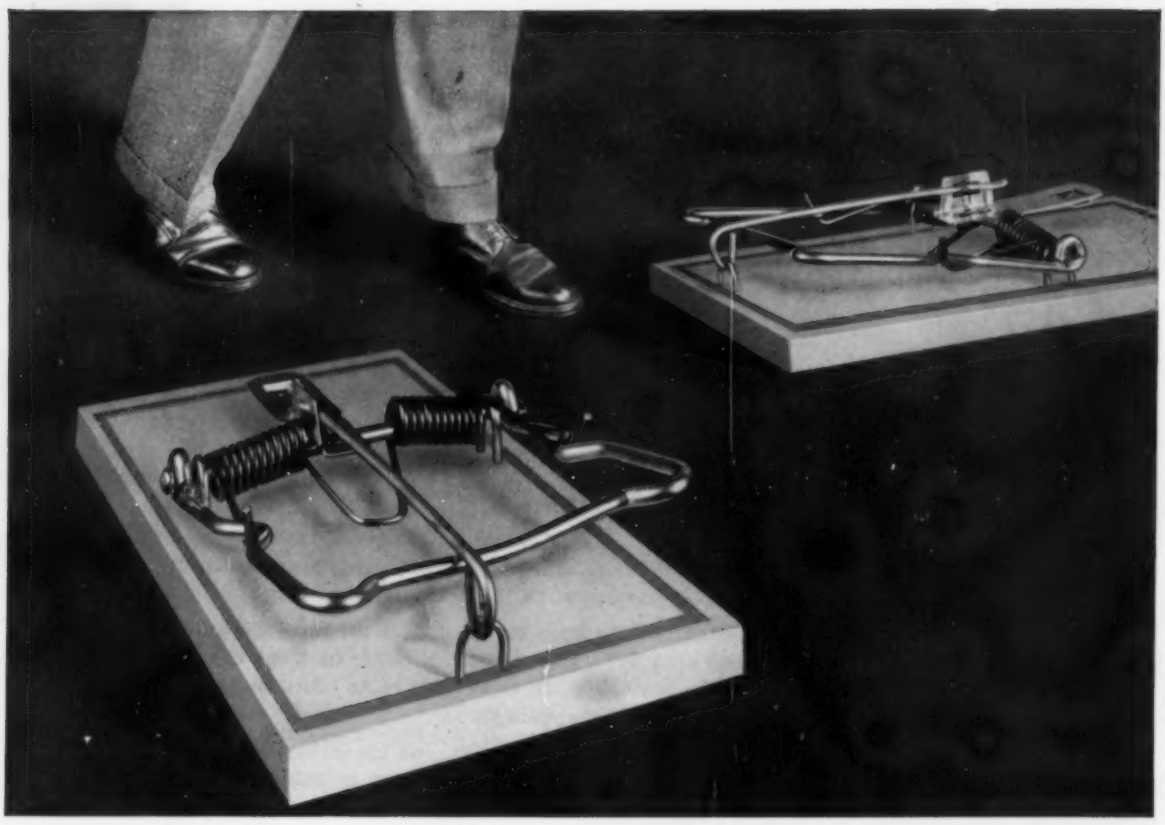
They find that some of the causes are readily apparent: Flagrant price cutting in their industry; added costs associated with the company's expansion program; and high but necessary research and product development costs.

Other causes are more obscure: Added fixed costs that inevitably creep in during a period of prolonged high business activity; manufacturing inefficiencies resulting from uneconomic plant layout and equipment; deteriorating labor productivity; products being forced on a shrinking market; and wasteful sales and distribution methods.

Mr. Metalworking's dilemma is not unique. Diminishing returns plague many metalworking companies. In most instances, solutions are suggested by a statement of the problem, but we believe the situation goes deeper than that.

Traditionally, we are sales minded. We subscribe to the notion that big sales automatically equal big profits. Mr. Metalworking's case suggests a more realistic approach: If your profits are slipping, take a look at your entire operation. Sales alone probably won't provide the right answer.

Irwin H. Such
EDITOR-IN-CHIEF



Two traps to avoid in today's sheet steel market

A sudden switch from feast to famine in the supply of sheet steel is a good possibility. So says Iron Age Magazine and other authorities who point to the likelihood of stepped-up demands from auto makers this spring as one reason for expecting a change.

This possibility creates two buying traps for *all* sheet and strip users!

One trap is "hand-to-mouth buying." It looks safe today—but it's a dangerous way of life, because you might be pressed to meet production demands if supply should tighten overnight.

The second trap—"loading up now at current prices—while quantity buying is easy." The hitch here, of course, is that what looks like a bargain may prove costly. You tie up needed capital—incur extra costs for storage, handling, insurance, taxes and possible damage or obsolescence. All this must be added to the cost of the steel—as much as 16.5%, or more, according to sharp-pencil purchasing experience.

How can you steer clear of these traps? Here's what many buyers who have learned the hard way advise:

1. Establish a steady buying pattern with a source such as Ryerson—whose stocks and resources afford maximum protection during times of short steel supply.
2. Estimate your requirements for a few months ahead. Then ask Ryerson to work out a schedule of steel shipments to be delivered as you need them.

So right now is the time to talk to your Ryerson sheet and strip specialist. He will be glad to review your requirements with you and work out a plan tailored to your needs.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Expenditures on New Plant & Equipment

(Millions of dollars)

	Second quarters		
	1957*	1956	1955
Manufacturing	4,177	3,734	2,795
Durable goods industries	2,171	1,862	1,278
Primary iron & steel	394	306	211
Primary nonferrous metals	203	88	45
Electrical machinery & equipment	169	142	102
Machinery, except electrical	353	254	188
Motor vehicles & equipment	355	431	256
Transportation equipment, excluding motor vehicles	157	103	65
Stone, clay & glass products	171	172	106
Other durable goods	369	366	306
Nondurable goods industries	2,006	1,872	1,517
Mining	310	319	235
Railroad	401	325	217
Transportation other than rail	482	423	420
Public utilities	1,618	1,199	1,052
Communications	2,738	2,880	471
Commercial & others			1,819
Totals	9,726	8,880	7,009

*Estimated.
Source: Commerce department, Securities & Exchange Commission.

Capital Spending Stays Up

Expenditures should set a new high of $37.4 billion in 1957, up 6.5 per cent from 1956's record. Gloom and doom talk is discounted. Nonferrous metals gain conspicuous

THE Commerce department and the Securities & Exchange Commission are giving no support to predictors of a depression this year. Their latest estimate (see table) of expenditures for new plant and equipment shows that this part of the economy continues to roll along at boom proportions.

Capital spending for the first quarter will probably hit an annual rate of $36.9 billion, while the second quarter rate should go to $38 billion. The total for the year will run about $37.4 billion, say Commerce and SEC.

Increases — Most major industries expect to increase their capital outlays over last year's: Manufacturers by about 10 per cent; railroads by almost 20 per cent; public utilities by about 24 per cent.

Significance — Total spending during the first quarter will be a little better than Commerce and SEC expected three months ago (STEEL, Dec. 17, 1956, p. 59). Business seems to have maintained an attitude of confidence about overall prospects for the year.

The second quarter outlook is bright. Capital spending for primary iron and steel, primary nonferrous metals, electrical machinery and equipment, machinery (except electrical), motor vehicles and equipment, and transportation equipment (excluding motor vehicles) will top $1.6 billion. This is a 23 per cent increase over 1956's second quarter figures of $1.3 billion.

All manufacturing will spend $3.9 billion for new plant and equipment in the first quarter, compared with the earlier estimate of $3.8 billion. Second quarter predictions run $4.2 billion. Durable goods industries will spend $2 billion, compared with the earlier estimate of $1.9 billion. They expect to spend $2.2 billion in the second quarter.

Metalworking—Primary iron and steel makers have allotted $385 million in the first quarter: Earlier estimate was $350 million. The second quarter estimate of $394 million is a 28 per cent increase over the second quarter of 1956.

Nonferrous industries will spend $172 million in the first quarter: Earlier estimate was $145 million. Some $203 million will be spent in the second quarter. This is a whopping 130 per cent gain over 1956's second quarter.

Machinery builders (except electrical) expect to spend more in the first quarter than originally planned. Some $353 million is estimated for the second quarter, a 39 per cent gain over the corresponding period in 1956.

These industries have pared back their first quarter spending from earlier estimates for the period: Electrical machinery and equipment, motor vehicles and equipment, and transportation equipment (excluding motor vehicles). But both electrical machinery and transportation equipment estimates for the second quarter are up over year ago figures.

Trade Fairs Ready

Five international expositions will show metalworking products in several countries

INTERNATIONAL trade fairs of interest to the metalworking industry will get off to an early start in 1957.

The International Automotive Exposition will be staged at Miami, Fla., Apr. 25-27, in conjunction with the Motor & Equipment Wholesalers Association's national convention. Many dealers from Latin America are expected.

The 68th Utrecht, Netherlands, Trade Fair is slated for Apr. 2-11. Tools, metalworking machinery and other commodities from 23 countries will be shown.

BIF Combines—The British Industries Fair is set for May 6-17 in Birmingham. In the past, only heavy machinery, electrical goods and other metalworking items were exhibited. Consumer goods, formerly exhibited in London, will be added this year. Buyers from 48 countries are expected.

The Swedish Industries Fair International will be held at Goteborg May 18-26. So far, ten countries have announced plans to participate.

The International British Plastics Exhibition in London is slated July 10-20. Exhibitors from eight countries, including the U.S., have already reserved space.

Europe Demands More U.S. Coal

European demand for U.S. coal, which tripled between 1954 and 1956, will continue to rise in 1957, says the Bureau of Mines. The oil shortage resulting from the Suez Canal crisis is a factor.

We exported 31.8 million net tons to Europe last year, 75 per cent of the area's total coal imports. This compares with 10.8 million net tons in 1954 and 29.3 million in 1955, the report shows.

The shortage of skilled miners in Europe, plus high industrial employment and the expanding steel industry, the bureau feels, will cause the gap between coal production and demand to continue to widen.

Assuming that the oil shortage will end, the report says: "In spite of increasing oil requirements in Europe's expanding energy demand, coal consumption in 1975 will be 12 per cent greater than it was in 1955."

Steel Goes Up at Enrico Fermi Atomic Plant

March marks the beginning of steel erection at the breeder reactor plant, Monroe, Mich. Some 1500 tons of steel will be used. Completion date for the reactor building is August, 1957. The project will cost $43.2 million

Europe Steel Grows

Italian and German firms seek increased technical assistance from American companies

ITALIAN and German steel firms are calling on more American know-how to increase their steel producing capacity.

Republic Steel Corp., Cleveland, with Fiat of Italy, will build a $120-million steel plant at Vado Ligure, near Genoa. Republic has had an agreement to supply the Italian auto maker with technical assistance for three years. The plant will use Labrador ore.

Expansion—Cornigliano, Sp. A., large Italian basic steel producer, has contracted with Patterson-Emerson - Comstock Inc., Pittsburgh, for a new blooming mill, under license from Mesta Machine Co., Pittsburgh, to be built at Genoa.

Other expansion includes installation of an electrolytic tinning line manufactured by Wean Engineering Co., Warren, O., and modification and repowering of the hot strip mill.

Germany — Die Klockner-Werke AG, which has an advisory arrangement with Republic Steel, has announced a new wide strip mill to be built at Bremen. In addition to technical assistance, the German firm plans to get equipment from the U.S.

Dr. Fritz-Aurel Goergen, president and general manager of Phoenix-Rheinrohr AG, Dusseldorf, revealed that his firm has completed talks with Bethlehem Steel Co., Bethlehem, Pa., "regarding future co-operation." Discussed were an exchange of experience and technical advice, and co-operation in exploring and exploiting new raw material sources.

Aircraft Exports Rise

Some 965 business and utility planes weighing 6000 lb or less were exported last year, report five major commercial aircraft manufacturers. This is an increase of nearly 50 per cent over the 1955 total. Their value: $12.5 million. Most of them went to South America and Western Europe.

Gray Iron Founders' Society stages market clinics to help . . .

Founders Serve Customers

A NEW do-it-yourself marketing program has been developed by the Gray Iron Founders' Society.

When the results of a recent GIFS market research survey indicated that foundry service to customers left much to be desired (STEEL, Nov. 12, p. 83), the society scheduled a series of nine regional marketing and sales clinics for its membership. The second seminar of the series was conducted in Cleveland on Mar. 7 by Richard C. Meloy, the society's marketing director.

Help Wanted—Since 55 per cent of the purchasing agents queried indicated that they lacked sufficient information to do an adequate job of buying gray iron or nodular castings, GIFS urges members to call more frequently on their accounts to provide buyers with technical data and suggestions for cutting costs. Although purchasing agents deal with 4.6 foundries on an average, they receive regular calls from only two gray iron castings salesmen.

Purchasing agents rate quality as the most important consideration in placing an order for castings (41 per cent put quality first; 27 per cent favor price; 24 per cent, delivery). GIFS emphasizes the need for closer tolerances, better appearance, improved machinability and higher strength.

Delivery—Delayed delivery was cited by many purchasing agents as a major cause of friction between buyer and seller, as evidenced by this comment: "The large majority of foundries I do business with seemingly disregard our required dates." Another critic reported: "Our company switched many castings from gray iron to aluminum because of the poor delivery." To forestall further losses on this count, GIFS suggests that foundrymen give their customers advance notice of impending delays. With adequate warning, customers could revise their releases to founders and keep operations running smoothly.

To many buyers, the lack of trained foundry representatives seemed a serious obstacle. One critic called for "qualified salesmen, not peddlers." Another declared that "salesmen have no knowledge of foundry schedules or operations." Sensitive to this criticism, GIFS has made tentative plans for three-day sales training clinics in the fall.

Market Analysis—While directing much of its effort toward the correction of certain deficiencies in service to regular customers, GIFS advises members to seek additional markets. It suggests that founders prepare questionnaires and mail them to broad lists of potential customers. Two benefits are cited: A return of 40 to 50 per cent might produce a surprising volume of business and a good prospect list will be built up. Surveys by telephone or personal contact are also recommended. One foundryman's survey of three prospects provided so much new business that he was forced to discontinue his survey, Mr. Meloy says.

To give full effect to their selling efforts, gray iron founders are stepping up their advertising activities through company and society programs.

Trent Tube Expands in West

Trent Tube Co., East Troy, Wis., will build a plant to make welded stainless steel and high alloy tubing and pipe at Fullerton, Calif., near Los Angeles.

Fred E. Wenzel, Trent president, says the plant will be ready for operations "before the middle of this year." The company is a wholly owned subsidiary of Crucible Steel Co. of America.

Consumer Spending To Hold Up

Consumers, optimistic about rising incomes, plan to spend at least as much this year as they did in 1956. Most consumers expect business to hold high.

Preliminary findings of the twelfth annual Survey of Consumer Finances indicate that 45 per cent of all nonfarm spending units are earning more than they did a year ago. Some 40 per cent of all spending units expect their incomes to go up this year.

The survey, conducted in January and February by the Federal Reserve Board, in co-operation with the Survey Research Center of the University of Michigan, included interviews with about 3000 spending units in 66 sampling areas throughout the U.S.

About 41 per cent of all spending units reported total incomes of at least $5000 in 1956, compared with 36 per cent in 1955. For 1956, 17 per cent reported incomes of $7500 or more, an increase over 1955 figures.

Bethlehem Steel Co.

Steel Is Key to Ship Boom

Some 99 are now being built or on order, 84 of which are tankers. Plate supply is the limiting factor as the U.S. grants fast tax aid on new ships to spur ordering

AMERICAN shipyards are humming toward what may be a banner year if enough steel plates can be produced.

Orders for 16 new ocean-going merchant ships were placed in January, 15 of them tankers. This is better than one-sixth the total (97) placed from 1953 to 1956 inclusive.

In addition, the Office of Defense Mobilization granted fast tax amortization certificates for $141 million in expanded oil tanker facilities in the first two months of this year.

Mostly Tankers—The total for merchant ships building and on order was brought to 99 with January commitments, of which 84 are tankers. The gross dead weight tonnage of these oil carriers will be 3,377,185.

East coast yards will build 83 ships, west coast yards five, gulf coast yards nine and Great Lakes yards two. With many foreign shipyards working at capacity, several European flag lines have placed orders in the U.S.

Still Tight—While plate production is expanding, the government's highway program, freight car construction plans and increasing shipyard demand are expected to keep plates and structurals in tight supply.

Long range replacement of vessels of wartime vintage and older by U.S. flag lines may become secondary to the rush for tankers, say some maritime sources, but it is expected that orders for 45 additional freighters will be placed this year.

ODM Deaf — Shipbuilders consumed 760,306 tons of steel last year (70 per cent plate) and wanted more. ODM turned down pleas for steel priorities for tankers, but shipyards expect to complete 25 merchant ships this year and more in 1958. Only ten were delivered in 1956.

"Jumboizing" of 11 World War II tankers is under way in three repair yards—cargo tanks are being made larger. More of this sort of work may be done.

Deliveries—Many ships placed this year will be delivered in 1959 and 1960, some even in 1961 and later. "Tankers," one industry authority says, "will undoubtedly lead, with ore carriers next in order of importance to meet the increased ore requirements of an expanding steel industry."

The Navy has awarded a contract to Bethlehem Steel Co.'s Quincy, Mass., shipyard for a cruiser with a 20,000-hp nuclear engine, and an atomic merchant ship is on the drawing board.

Builds Uranium Plant

D. E. Makepeace Co., Attleboro, Mass., is constructing a 53,000 sq-ft plant in Plainville, Mass., for the working and treating of uranium.

The company, one of the Englehard Industries, will produce atomic fuel fillers, clad fuel elements and related reactor components. Operations will include melting, forging, rolling, vacuum annealing, slitting, cladding and machining.

Rotary Studies Ohio Sites

J&L will take over the Detroit electric steelmaker about Apr. 30, pending expected stockholder approval. Rotary will be expanded, perhaps with a new plant near Toledo, O.

STOCKHOLDERS of Rotary Electric Steel Co., Detroit, will vote Wednesday on a proposal to sell their company to Jones & Laughlin Steel Corp., Pittsburgh. The vote will culminate negotiations announced late in 1956. (See STEEL, Dec. 31, 1956, p. 29.) Approval is expected.

J&L stockholders will vote on Apr. 25, and the transfer is expected to take place on Apr. 30.

Benefits—Rotary produces stainless, alloy and carbon steels, but its principal product is stainless. The acquisition of Rotary will be mutually beneficial:

It will provide J&L a quick entry into the stainless business, a field it has been eying for some time. It will provide Rotary with facilities to produce stainless sheets and strip, strengthening its market position. Much of its product has been semifinished steel which was sold to rollers of stainless sheets and strip. One customer now makes its own semifinished, and there is the strong likelihood that others may do likewise.

To reduce its dependency, Rotary has been moving toward a broader product mix. It has expanded into the finishing of stainless steel bars.

Shift to Ohio?—Rotary is drawing up plans for construction of a plant to cold roll stainless sheets and strip. Lack of space at its present furnace plant (42 acres) at the northeast edge of Detroit makes it necessary to search for a site for the rolling mill. Being studied are sites in the 55-mile stretch between Detroit and Toledo, O. Taxwise, Rotary finds Ohio would have advantages over Michigan.

Needed in addition to sufficient land are adequate public utilities —water, sewers, electric power. Ultimately, Rotary may consolidate all its facilities on the site.

Cold Mill, Too — Plans call for the eventual addition of a hot strip mill at the site of the cold rolling mill. This would become a logical spot for the location of steelmaking furnaces when the present electric furnace plant at Detroit wears out.

The installation Rotary is thinking about will cost around $15 million, a prohibitive sum for it to finance alone. The company has a stockholders' equity of $21.2 million and a long term debt of $4.5 million. In contrast, J&L has a stockholders' equity of $451.2 million and a long term debt of $130.3 million.

Plans for Tubing—After Rotary gets its cold rolling mill operating (target date is July, 1958), it will go into the welded stainless steel tubing business. This also would be located at the new site. Rotary is planning to go into the drawing of fine stainless steel wire, too. This operation probably will go onto a 10-acre site the company owns in the vicinity of its present plant.

Until the new cold rolling mill is built, the J&L cold mills will be used to produce stainless sheets and strip. Hot bands for the Rotary cold mill will be produced from Rotary slabs at J&L's Cleveland and Pittsburgh mills until Rotary builds a hot strip mill.

Rotary is expected to remain under its present management.

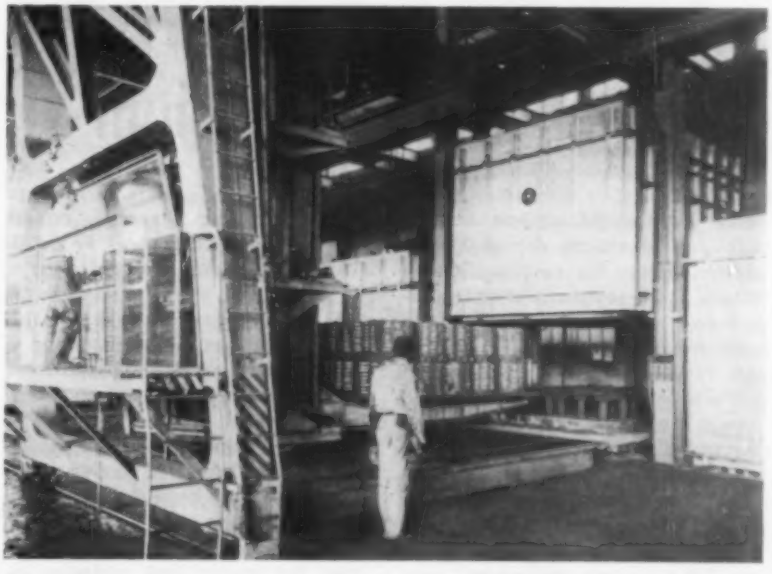
Contract Builders Set Pace

Firms in the contract construction industry are growing faster in number than any other major industrial division, says the Department of Commerce.

Between 1952 and 1955, the total rose from 418,000 to 475,000, a 14 per cent increase, compared with a 3 per cent increase in the wholesale trade division, the second fastest growing industry.

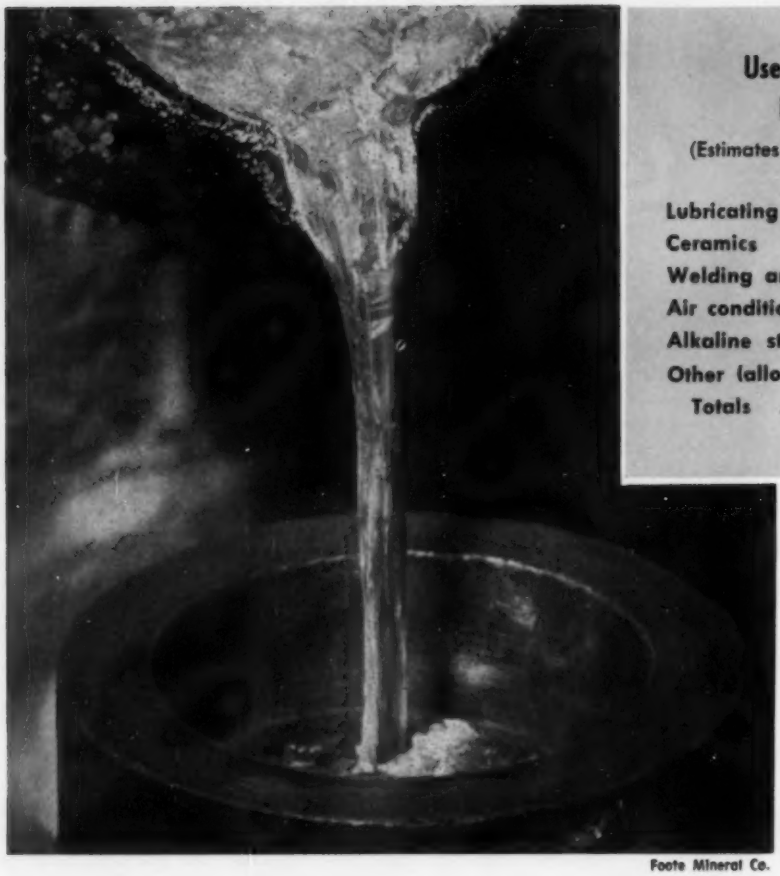
Less than 0.1 per cent of the firms have 500 or more employees.

Half the construction organizations are five years old or older. In all industries, half are 6.75 years old or older. Of all newly formed firms, 72 per cent survive the first year.



General Metals Installs New Electric Furnaces

A bank of eight Westinghouse electric furnaces anneals castings at General Metals Corp.'s Oakland, Calif., foundry. Over 1800 castings for automobiles are shown being removed from one of the furnaces. After casting, the hubs are kept in the furnace at 1700°F for 40 hours, then cooled gradually to 1300°F over the next 18 hours



Foote Mineral Co.

Uses of Lithium Compounds In the U.S. This Year

(Estimates based on carbonate equivalent)

	(000) lb	Per Cent
Lubricating greases	4370	38
Ceramics	2300	20
Welding and brazing	1610	14
Air conditioning	1380	12
Alkaline storage batteries	805	7
Other (alloy, etc.)	1035	9
Totals	11,500	100

Keep an Eye on Lithium

THE lightweight among metals, lithium, is aiming for a heavyweight role. Its consumption in alloys and compounds has increased tenfold in five years and now totals 11.5 million lb annually.

Faith — Producers are excited about the metal's future. They've poured $23 million into new and expanded facilities over the last five years. Their production capacity (24 million lb yearly) is in excess of commercial demand. But it's felt that new markets will soon take up the slack.

Properties—Metallurgists, chemists and engineers are attracted by the metal's extremes in chemical and physical properties. Lithium melts at 354°F and boils at 2402°F, giving it the longest molten range of any alkali metal. This range makes it possible for it to take over where water leaves off, enhances its use as a coolant.

Uses—It has applications as a metal, alloy and compound. Pure metal is utilized in hardening lead alloys, and in the manufacture of lithium compounds, some of which can only be produced directly from the metal (the hydride, amide and borohydride).

Compounds represent the largest use, the grease and ceramics industries being the biggest consumers. Lithium hydroxide, used by grease manufacturers, has some of the properties of alkali metals (like sodium) and others of alkaline-earth metals (like calcium). The compound has the temperature stability of sodium-base greases and the water resistance of calcium-base lubricants.

Lithium carbonate goes to the ceramics industry for fluxing material in porcelain enamels. Lithium additions permit lower firing temperatures (under 1000°F) and provide a free flowing, strongly adherent enamel coat. Abrasion and acid resistance of the finish is good. Other growing uses for compounds are: Lithium hydroxide in alkaline storage batteries; lithium chloride and bromide in air conditioning; lithium fluoride in brazing and welding fluxes.

Metal—Production of the pure metal in 1957 will hit 400,000 lb. Lithium Corp. of America Inc., Minneapolis, will produce three-fourths of the total. It believes production could reach 500,000 lb annually by 1960. A 1-million-lb year is termed a possibility.

Until recently, the Minnesota firm was the only producer of pure metal. Newcomers are: Maywood Chemical Co., Maywood, N. J.; Foote Mineral Co., Philadelphia; and American Potash & Chemical Corp., Los Angeles. Maywood rates second. In the past, Foote and American Potash concentrated mainly on compounds, but their metal production is on the upswing.

Atomics—Nuclear energy applications represent a growing market. Although use figures are classified, it is known that con-

sumption is on the increase in a number of areas, including: High energy fuels, heat transfer media, neutron reactor shields and other fusion reactor functions. Many of the metal's unusual thermal and nuclear functions are yet to be applied.

"Foote is quite optimistic about the future of lithium metal," says James Fentress, general sales manager. "We feel it will offer competition to sodium metal and sodium potassium alloys because of its high heat capacity, unusual nuclear properties and long liquid range. Commercialization of these new applications could bring about as much as another tenfold increase in the market for lithium metal within the next five years."

Foote also predicts a promising future for lithium in metallurgy. Reason: New uses in electric furnaces and open hearth steelmaking may open the door to large volume consumption. As little as 0.001 per cent lithium is effective in scavenging gases, in degassing high conductivity copper and copper-base alloys, and in providing sound precision castings by eliminating or minimizing hydrogen, nitrogen and oxygen in metal.

Potentials — Says Marshall Sittig, managing director and the first president of the American Lithium Institute Inc., Princeton, N. J.: "Short-range, best lithium potential seems to be in catalysts for polyolefin plastics and rubbers. Somewhat longer range, but much larger potentials, appear to be in lithium-containing alloys and in lithia-containing glasses. This metal should not be sold short as an alloy ingredient: Additions of 10 per cent lithium in light alloys are extremely practical."

Proof — Firestone Rubber Co., Akron, is using the lithium catalyst idea to manufacture a truly synthetic "natural" rubber—lithium is melted under the surface of a high-boiling hydrocarbon, stirred at high speed and cooled.

Price—As metal producers improve manufacturing techniques and increase volume, costs and selling prices will be lowered.

A trend toward reduced prices is already apparent. In 1950, the pure metal sold for $12 a pound. It now sells for under $10 and may stabilize soon between $8 and $9.

U. S. ORE STOCKS

(In gross tons)

Ores by Source	Jan. 1, 1957	Jan. 1, 1956
Lake Superior	41,106,779	43,870,996
Other U. S.	3,038,407	2,462,090
Canadian	6,516,131	4,085,662
Other Foreign	4,574,302	2,899,022
Totals	55,235,619	53,317,770

Source: Lake Superior Iron Ore Association.

Iron Ore Stocks Are O.K.

MOST steel companies say their stocks of iron ore are comfortable. U.S. Steel Corp. thinks it won't run short if there is no undue delay in starting lake shipments. (Its Pittsburgh Steamship Division fleet was idled for a month after the signing of the steel contract by the strike of two maritime unions.)

Stocks—U.S. and Canadian supplies of Lake Superior ore were higher at the start of this year than they were in eight of the last ten years. The increasing importance of imported ores is showing up in the stocks on hand at furnace yards. In the Pittsburgh-Youngstown area, supplies of foreign ore (not including Canadian) are up 1 million tons from 1956.

Compared with those of a year ago, furnace stocks of U.S. Lake Superior ore are lowest in the Cleveland-Detroit district — they were 7,327,870 tons on Jan. 1. At the present rate of consumption, 1¼-million tons a month, supplies will last past May. Shipments will come in from the upper lake ports long before that.

Weather—Ice in the upper lakes is heavier this season than it has been in many years. Pittsburgh Steamship is hoping that March will be warm, so that it will be able to send its ships out by Apr. 1.

W. W. Oak, meteorologist in charge of the Detroit weather bureau, predicts lake boats will be able to get into Sault Ste. Marie by Apr. 3, into Duluth-Superior harbor by Apr. 10 and into Marquette, Mich., harbor by Apr. 15.

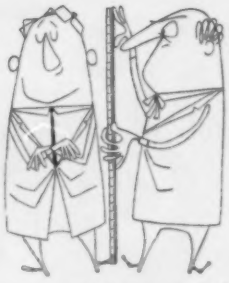
Shipments—Look for Lake Superior ore shipments this season to fall between last year's 77.6 million gross tons and 1955's 87.5 million tons. The possibility of more organizational efforts by the maritime unions clouds predictions.

An increasing portion of the ore flow will be taconite and jasper. Shipments this year will be around 6 million tons or more. Production will be considerably higher than shipments. Erie Mining Co.'s plant, with an annual capacity of 7.5 million tons, gets under way this year, but all production will be held for shipments next year.

Imports—Foreign ore came into the U.S. in record amounts last year. Shipments are estimated at 31 million gross tons. Imports from Canada are placed at 14 million tons, and those from Venezuela will probably total more than 9 million tons.

The upward trend of imports will continue this year. Look for more Canadian, Venezuelan and Chilean ores to come in.

Republican Curtis Sees Small Firms Growing



"IT'S NOT just another bill in the hopper," hopefully comments Rep. Thomas B. Curtis (Rep., Mo.). The bill he introduced last week aims to accomplish two goals at the same time: 1. Ease the small businessmen's tax burden. 2. Curb the trend to mergers. Even Representative Curtis doesn't believe any legislation will come out of this Congress to help small business, but his bill may be the foundation for law in the next Congress.

What counts: The House Ways & Means committee (where all tax legislation must begin) appears to have encouraged the Missourian that he is on the right track. He hopes the committee will hold hearings on the bill soon. "My bill has imperfections," he notes, "but it is at least a vehicle for the Ways & Means committee to get started with . . . something they haven't had."

Representative Curtis takes on the Treasury department on its own battleground. Treasury's philosophy: "If any legislation will lower revenue, we're against it." But, says Representative Curtis, his bill will boost revenue in the long run by keeping more small businesses alive to pay taxes. Mergers, he says, cut directly into Treasury revenue, because they can be made with funds which might have gone for taxes.

The congressman's philosophy of economic growth makes itself clear in the bill's first provision: Firms could deduct from taxable income an amount equal to additional investment in depreciable assets or inventory during the taxable year, but those deductions could not exceed 20 per cent of net income or $30,000, whichever is lower. The bill itself makes no distinction between big and small firms. To not try to define a small business is to eliminate an important hurdle the bill must make before becoming law, he says.

Another provision in the bill would allow firms to set aside earnings in anticipation of estate taxes. Many mergers, believes Representative Curtis, come about because the small businessman wishes to protect his estate from dissolution upon his death. He wants small businessmen to be able to buy noninterest bearing estate tax anticipation certificates. They would not be a part of the taxable estate, up to a maximum of $100,000. Provision would also be made for payment of the estate tax within ten years after death. Under present law, the estate tax is due within 15 months of death.

A member of Congress about ten years, Representative Curtis called his first news conference on major legislative matters to discuss this bill. It's safe to assume he has the backing of men in high places. The administration is determined to take the aid-for-small-business ball away from the Democrats.

Seaway Tolls Undecided

Don't look for an early announcement of the tolls to be charged on the St. Lawrence Seaway. Although there are probably many construction projects (especially port projects) being held up until the toll question is settled, spokesmen for the St. Lawrence Seaway Development Corp. feel the situation is not critical. "They know we must come up with an attractive toll." There's a chance public hearings may come this fall.

The corporation has now pointed out what it considers to be desirable dimensions for seaway ships: Length, 715 to 730 ft; beam, 72 to 75 ft.

The borrowing limit of the corporation will almost certainly be boosted to the additional $35 million it wants from Congress, but this may not be enough to finish the job. Example of rising costs: The best bid on a section of the South Cornwall channel was $14 million over the government's estimate.

Sidelight: Canadian builders would probably do the job at the government's figure, but U.S. labor unions would object violently.

Coming: Highway Program Report

Bertram D. Tallamy, new federal highway administrator, is expected to make a generally favorable progress report on the road program to the Senate Roads subcommittee.

Seventy-six contracts costing $98 million were awarded during February. They involved 173 miles of roadway and 204 bridges in the interstate system. Total awards under the road program now stand at $441 million.

Meet Carl O. Friend:

He's administrative manager of Nordberg Mfg. Co.'s heavy machinery division in Milwaukee. For about the next six months, he'll be director of the Power Equipment Division of Business & Defense Services Administration. In Washington, he can be reached at STerling 3-9200, Extension 4241.

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McKay's Press Feed or Cut-Up Line has rapidly gained acceptance wherever mass production of metal stampings is part of the manufacturing function. . . . From coil handling to automatic press feeding this line is the most successful yet developed. It uncoils, cleans, conditions and precisely measures the steel swiftly and economically. McKay engineers will show you one of these modern lines in operation at your earliest convenience.

THE McKAY MACHINE COMPANY
Youngstown, Ohio

McK

SETTING THE STANDARDS OF QUALITY METAL WORKING MACHINES FOR TWO GENERATIONS

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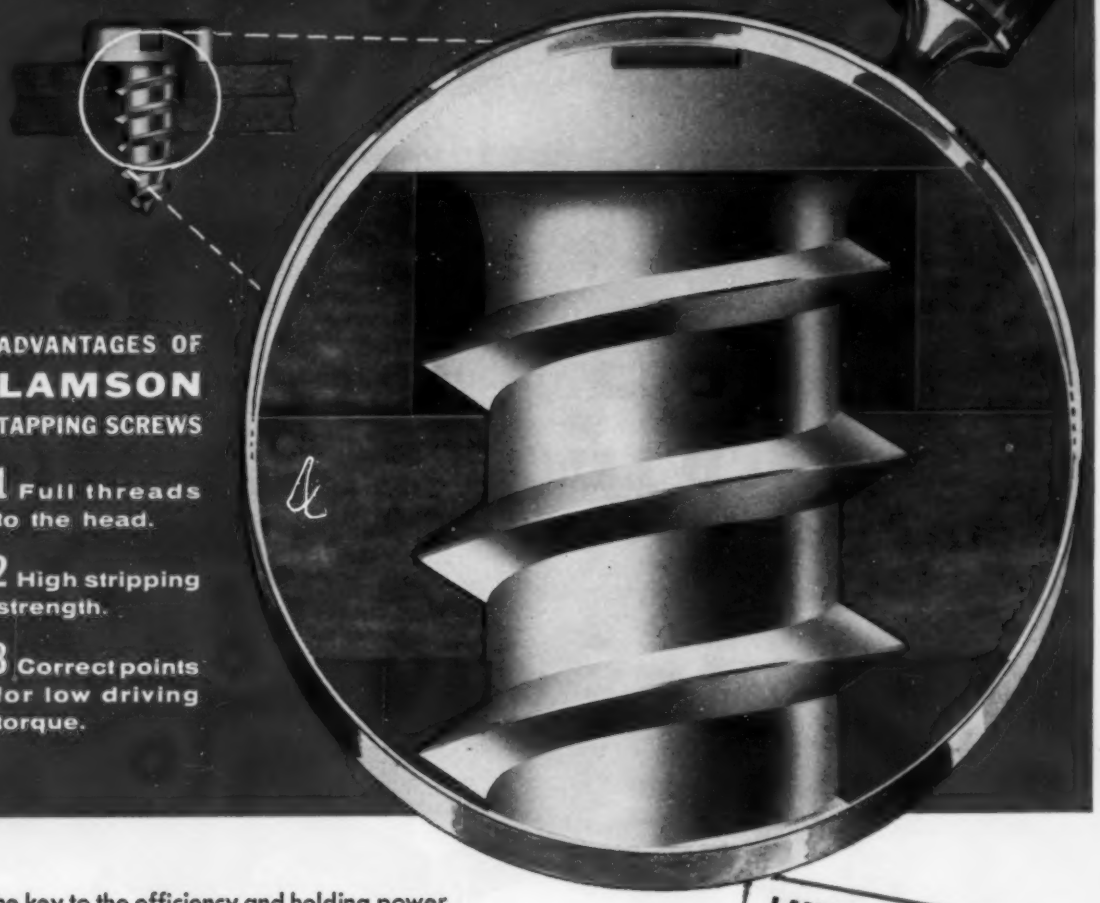
Here's the "Inside Story" on LAMSON Tapping Screws



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1 Full threads to the head.

2 High stripping strength.

3 Correct points for low driving torque.

The key to the efficiency and holding power of Lamson Tapping Screws is the *controlled fit* between the screw threads and the hole into which they are driven. The enlarged section shows how threads are formed when the right sized screw is used in the correct diameter hole.

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Plastics replace steel in Chrysler Corp.'s auto heater housings

Plastics Production Grows

(Tons of resin)

1957*	2,150,000
1956	2,056,450
1955	1,869,458
1954	1,413,901
1947	625,849

Source: The Society of the Plastics Industry Inc.

*Estimated.

Plastics Gain Acceptance

PLASTICS materials and components are gaining wider acceptance in metalworking.

Reports a metal fabricating executive attending the Society of the Plastics Industry's annual meeting (Los Angeles, Mar. 18-21): "The plastics industry is growing in all fields (consumer, industrial and military), but it is planned growth with sound research in back of it. Producers are helping us solve some of our coating problems."

Size — Production of synthetic plastics and resin materials reached 2,056,450 tons in 1956 (see table). This year's outlook: 2,150,000 tons.

Most plastics materials should show production increases of some 5 per cent. Reinforced plastics could register a 30 per cent gain.

During 1956, about 70,000 tons of reinforced plastics were consumed, a 30 per cent gain over 1955. Biggest users were the aircraft and construction industries. Consumer products took only 10 per cent of the total. (For more details on reinforced plastics, see STEEL, Mar. 11, p. 172.)

Speaker—George Epstein, head, research & development section-plastics, Aerojet-General Corp., gives these reasons for using the material in rockets: 1. High strength to weight ratios. 2. Desirable thermal properties. 3. Noncritical materials. 4. Formation versatility and low cost production.

A walk through the Pacific Coast Plastics Exposition, running concurrently with SPI's annual meeting, reveals that plastics are working hand-in-glove with metalworking to help solve some specialized production problems. Cases in point:

1. Bakelite Co., a division of Union Carbide & Carbon Corp., is explaining to convention delegates that its new primer permits the adhesion of vinyl dispersion coatings to steel, tin plate, black iron, aluminum and copper. It means that sheet metal can be coated with plastisol or organosol systems prior to being stamped or formed without loss of adhesion. In most cases, coating costs should be reduced.

2. Lycoming Division, Avco Mfg. Corp., is using a new plastics compound to seal metal castings (cast iron, magnesium, copper and aluminum alloys) for aircraft engines. Result: It has been able to save 20 per cent in sealing production costs, reduce cycle time 40 per cent.

Purpose—Education of possible users is the key mission of exhibitors. Explains a representative of Koppers Co. Inc.: "We want to interest the automotive and aircraft engineers in the characteristics and properties of our particular plastics line. We feel our materials have excellent possibilities in both industries."

Search for Oil

Year	Number of wells completed
1957	60,000*
1956	58,160
1955	56,682
1954	53,930
1953	49,279
1952	45,821
1951	44,516
1950	43,279
1949	39,038
1948	39,778
1947	33,122
1946	29,229

*Estimated.

Source: Oil & Gas Journal.

The National Supply Co.

Oil Drillings Increase

Production of rigs, tubing and pipe challenges metalworking as the oil industry continues to boom. Some 77,000 wells may be completed annually by 1970

WORLD-WIDE thirst for oil is putting pressure on American suppliers of drilling rigs, oil country tubular products and line pipe. Shipments of tubular products, which increased from 1.6 million tons in 1952 to 2.6 million tons in 1956, will have to total 3.2 million tons by 1960 to meet potential demand. With a steady increase in well completions and in average well depth, tubemakers may have to produce 4.2 million tons of tubular products annually by 1970.

The intensifying search for oil prompts predictions of well requirements which are a challenge to the petroleum industry's suppliers of steel. Some 58,160 wells were completed last year, compared with 56,682 in 1955. Forecasts for 1957 average 60,000 completions. "We estimate that in the 1960-1965 period, the petroleum industry will drill an average of 65,000 wells annually. Tube requirements will average 3.2 million tons," says Henry J. Wallace, vice president, sales, National Tube Division, U.S. Steel Corp.

Bright Prospects—Several tubemakers are looking farther into the future. One firm anticipates completion of 77,000 wells annually by 1970. Says that producer's market research director: "We expect the average well depth to increase from 4022 ft in 1956 to 4500 in 1970. Oil country demand for tubular products will amount to about 4.2 million tons by 1970. It's a fine outlook, but will we have sufficient profits and enough tax help to enable us to expand in time to fill that need?"

Short-term enthusiasm is unanimous. Tubemakers opened second quarter order books early in February and quickly sold all available tonnage. A Pittsburgh Steel Co. official comments: "After hearing rumors of a second quarter decline in demand, we were mildly skeptical when orders poured in. We looked for signs of softening but found none."

Offshore — "We expect a substantial increase in demand for oil producing equipment this year from offshore operations in Louisiana and California," reports J. W. Owings, manager of the pipe sales division, Republic Steel Corp., Cleveland. An eastern tubemaker says offshore operations take less than 5 per cent of drill pipe now, but their share is gaining quickly and will continue to grow.

Reports of a sales slowdown circulated early this year, following a decline in number of operating rigs. Active rigs totaled 2250 in mid-February, 1957, compared with 2395 at the same time last year. Steel suppliers quickly squelched suggestions of a decline in oil well needs. Says a major rig producer: "The number of rigs will increase when weather improves in the West and in Canada. The old, less efficient rigs are being taken out of service. The average new rig is doing twice as much work as its counterpart did ten years ago."

Widespread Need — With improvements in rigs, the need for new ones is not mounting as quickly as demand for tubing—but sales are firm. National Supply Co., Pittsburgh, manufacturer of drilling machinery and tubing, expects high level operations at machinery and equipment plants, as well as capacity operations at tube mills. Demand for the company's rigs comes from five continents. A. W. McKinney, president, says: "There's no drop in the ascending curve of exports."

Although the supply of rigs is catching up with the demands of

American users, there are numerous tight spots in the supply of oil well equipment. They include line pipe, high grades of casing and foreign requirements for all products.

Growth in Americas—Republic's Mr. Owings says: "We anticipate a substantial increase in the rate of drilling in Canada, Central and South America in 1957. Domestic drilling will be up about 2 per cent this year."

A second critical supply area is in production of higher grade tubular products. Mr. Owings adds: "Demand for higher grades of pipe is increasing every year, as the average depth of wells increases. Requirements of high-grade casing will probably exceed supply throughout 1957."

Long Wait—Line pipe shortage will probably be severe for several years. Production, limited by plate shortages, is sold out at least three years ahead at all major mills.

One improvement in supply is in semifinished steel. With demand for bar products below the potential capacity of mills, tube rounds are easier to get. Decreases in production of flat-rolled products have improved the availability of skelp for welded pipe. Nonintegrated tube mills say they can now fill their needs from regular mill sources.

Delay in Growth—Only the government's refusal to grant fast tax amortization to expansion planners prevents steelmakers from moving more quickly to improve critical supply situations. In two applications for rapid tax amortization, National Tube Division requested amortization of the cost of increasing production of seamless tube at McKeesport, Pa., and Lorain, O. Jones & Laughlin Steel Corp., Pittsburgh, sought the tax aid to build an integrated tube mill in Houston.

Tubemakers point out that petroleum requirements are growing too quickly to permit much delay in these and other expansion projects.

Putnam Tool Expands

Ernest C. Putnam, president, Putnam Tool Co., Detroit, says the company will spend $600,000 for expansion this year.

End Use Distribution of Diecasting Sales in 1956

(Thousands of pounds)*

End Use Industry Groups	ZINC	ALUMINUM	MAGNESIUM	BRASS
Agricultural, Mining, Construction Equipment	4,900	7,750	6	45
Automotive (Motor Vehicles)	248,000	93,000	1,650	260
Other Transportation	5,200	4,000	40	5
Industrial, Commercial Machinery & Tools	38,000	42,000	2,290	825
Electronic Devices & Communications Equipment	7,500	2,750	15	
Office Equipment & Business Machines	15,000	19,250	500	30
Plumbing, Heating & Builders' Hardware	23,000	6,000		2,475
Photographic, Optical, Recording Devices, etc.	10,300	16,000	125	30
Timing & Time Operated Devices; Clocks	5,000	3,500		55
Home Appliances	104,000	55,000	500	15
Toys, Sporting Goods, Personal Goods & Jewelry	4,900	7,750	9	35
National Defense	2,200	5,500	465	725
Totals by metals	468,000	262,500	5,600	4,500

*Estimated. Totals represent all job shop sales only.
Source: Reports of members to American Die Casting Institute.

Diecasting Outlook Bright

EXPANDING markets give job shop diecasters bright prospects for another banner year. Industry spokesmen predict sales of $440 million, within $10 million of the all-time high reached in 1955. Automotive and some related markets are exceptions to the trend.

"Based on present schedules, automobile production will not reach the figures forecast, and, so far, other industries have not increased demand a lot," says Walter M. Goldhammer, vice president of Superior Die Casting Co., Cleveland, speaking about job shops heavily dependent on automobiles.

Second Best—Sales of jobbing diecasters amounted to $429.7 million in 1956, reports David Laine, secretary of American Die Casting Institute, the second best year on record.

"Increasing sales to the home appliance, business machine and office equipment industries will more than offset the curtailed automotive consumption," Mr. Laine says.

Records — Zinc diecasting production in 1956 (725 million lb) was 11.5 per cent below the 1955 mark, according to the institute, but 840 million lb is forecast for 1957, a rise of 13.7 per cent. Aluminum, which hit a peak of 367,250,000 lb in 1956, is expected to reach 450 million lb this year. Brass (9.5 million lb) and magnesium (6.2 million lb) set records, the institute's report shows.

Job shop diecasters shipped 71.2 per cent of all aluminum castings produced, 63.1 per cent of zinc, 90 per cent of magnesium and 47.3 per cent of brass.

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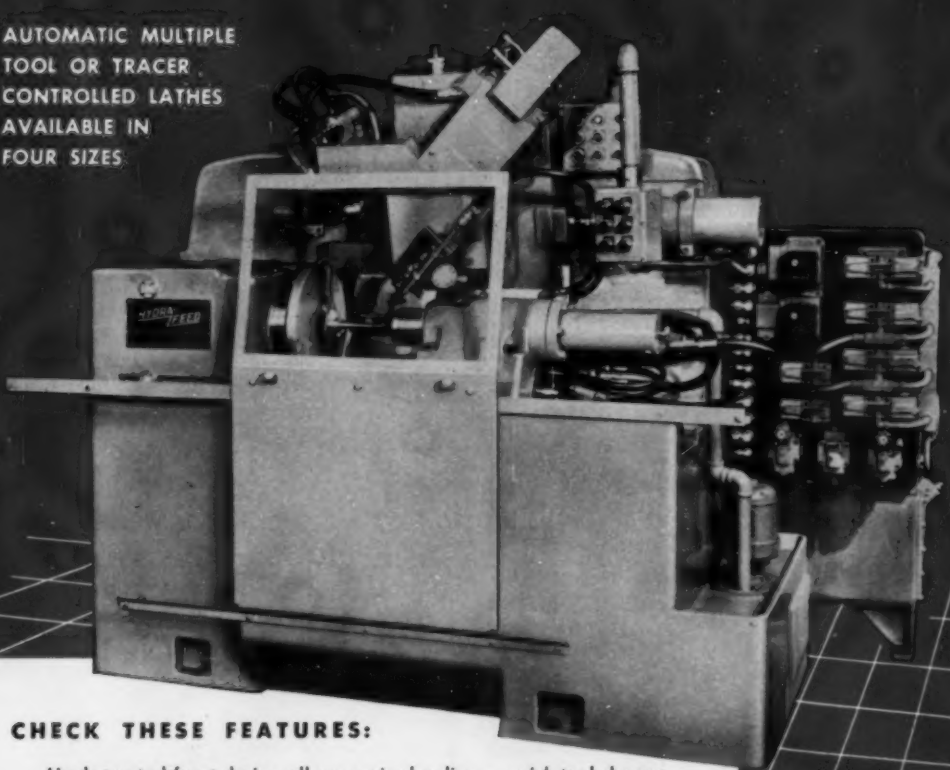

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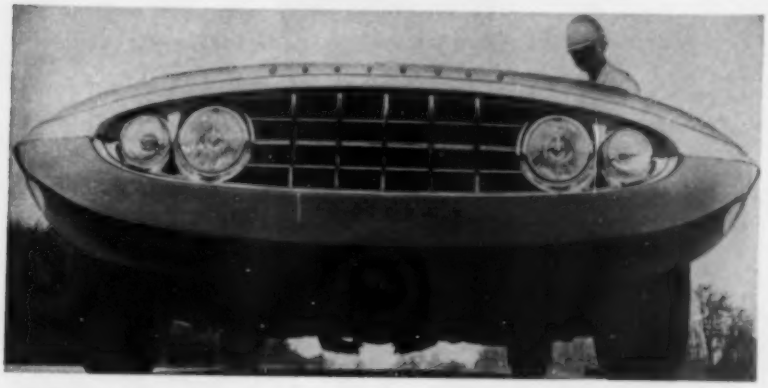

Styling will be revamped like Chrysler Dart's grille and . . .

Packard Predictor's rear window, but industrywise . . .

Chassis Changes Mark '58

THE THREE-YEAR styling cycle may be making a comeback. L. L. Colbert, president, Chrysler Corp., says his company has returned to it. Other firms show signs of following suit.

This year, for example, most of the industry made major engineering and styling changes. If the three-year cycle does return, the emphasis will fall on engineering in 1958. Major styling touchups will be scheduled for 1959 models. The 1960 cars will start the pattern over again.

Hints — Talk around Detroit bolsters this theory. Chassis changes seem to be the order for 1958. Only five or six cars are scheduled for complete engineering and styling overhauls.

Tooling costs will be down from last year's $900 million, but it's estimated that close to $600 million will be spent on '58 model tooling. Most of that will be split between Ford and General Motors. Chrysler reputedly is spending about $90 million on next year's line.

Shapeup—Looking ahead, there will be at least five new engines in 1958. They'll be approaching 10:1 compression ratios (one supposedly will be 12:1) with more than 360 cu-in. displacements.

Chevrolet and Edsel will have new power plants. Pontiac is going back to the forged crankshaft and its engine will be revamped. Chrysler is readying another engine—supposedly for the De Soto line. Studebaker-Packard Corp. hopes to add a larger engine for its high priced Studebakers and Packards.

Transmissions—Buick will put its version of Chevy's Turboglide transmission into production.

Pontiac's transmission will be revamped, according to some engineering sources. It, too, will be a version of the Turboglide.

Ford Division figures on adopting pushbutton controls for top priced series. This will be similar to the Merc-O-Matic transmission now available on Mercurys. Chrysler plans some more modifications for its Torqueflite unit.

American Motors and S-P are rumored to have new transmissions in the works.

Frames—The semiladder type frame adopted by Cadillac this year is catching on rapidly in GM circles.

Pontiac, which will have its own body, is expected to pick up this type construction. Buick and Olds also are eying it.

Lincoln already has set its course toward unit body construction which does away with a separate frame. Other Ford divisions and Chrysler Corp. will pretty much stick with what they have.

Suspension—New frames make for more suspension talk. Air suspension, now seen on GMC trucks and Cadillac's Eldorado brougham, reportedly will be standard on high priced Buicks and Oldsmobiles and on all Cadil-

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lacs. Pontiac may make it an optional item. So may Chevrolet.

Edsel and Lincoln have been mentioned in air suspension circles, but there's no confirmation. Chrysler will stick with Torsion-Aire. Packard and, presumably, Studebaker Presidents will return to torsion bar systems.

Costly—Experts talking behind the scenes at a recent meeting of the Society of Automotive Engineers pointed out that air suspension offers the levelizing ride now available only with torsion suspension setups.

The engineers also admit (privately) that there are coil and leaf spring arrangements which will give an equally smooth ride. Several estimate the hookup of levelizing bars, valves and air cylinders will make air suspension cost at least one-third more than conventional springs.

Tiny Trend—One item which is scheduled for 1958 Chrysler cars is a centralized electrohydraulic system to operate power windows, seats and steering. Up to now, these accessories have had separate actuating units.

Brakes—The industry is well aware that high horsepower, heavier cars and 14-in. wheels have strained present braking systems to the limit. Next year will see a general push for better brakes. Brake manufacturers indicate there will be at least two, possibly three, disc brake systems in common use. Additional help for shoe brakes will come in the form of cooling fins, fluted wheel covers, possibly more aluminum brake drums.

Moving out of the engineering field into styling, you find a rash of minor (but expensive) changes in headlights, grilles and rear window areas.

Lightup—Almost without exception, new models will have dual headlights of one sort or another next year.

Grilles will continue to move toward the integral grille and wraparound bumper construction seen experimentally on Chrysler's Dart and in modified form on the 1957 Oldsmobile.

Rear Pillars—The reverse angle rear pillar which made its debut on the 1950 Nash is seen today on American Motors' lines and Mercury's Turnpike Cruiser. Next year it will spread to some Studebaker models and to a scaled down version of Packard's Predictor. Some talksters place it on Pontiac and Edsel as well. It probably will be the key to those cars making major styling changes.

Roundup—Generally speaking, car heights will not drop much more next year. Exceptions are Pontiac, Chevy and S-P cars which have to catch up with the others.

There will be a continued emphasis on sculptured steel styling, less attention to chrome stripping.

Anodized aluminum in reds, blues and greens will appear as interior trim on many cars. Ford generally will adopt aluminum as its grille material with one exception—Edsel has a zinc diecast grille styled along Jaguar lines.

Time—When will the '58s appear? The Edsel is scheduled for September, but the others will follow right along normal announcement time. Chevy seems like the best bet for second announcement—possibly late September, but, more likely, early in October. Chrysler cars should make the move after that.

Pontiac Sets Hot Pace

Pontiac has a reputation of being a hot performance car this year. We have been driving two.

Both were Super Chiefs powered with 270-hp, V-8 engines sporting four-barreled carbs. Primary tests on gas consumption and general handling were run with a car which had been purchased early in January.

It had 2800 miles on the speedometer. The owner reports he has been averaging 17.5 mpg at 55 mph highway speeds using high octane gas. We drove it at 65 mph for slightly more than 200 miles and averaged 16.4 mpg. In-town driving (over 400 miles) averaged 14.5 mpg.

We noticed a flock of rattles in this car, most of which stemmed from sloppy assembly. The seals around both wingports were poorly fitted and resulted in an irritating whistle.

The automatic transmission was adequate, but the two-step shift was noticeable and slightly jerky—even on smooth acceleration. Top speed on several trials was 106 mph.

Company Car—For acceleration tests, we picked up a similar model from Pontiac. It was in top condition. The transmission was smooth. There were no rattles, but the left hand wingport on this one whistled.

Here are the results of our tests without speedometer correction:

- Average of six acceleration tests on hardtop pavement (0 to 60 mph): 8.3 seconds (includes automatic transmission shifts).
- Average of six acceleration tests (0 to 30 mph): 3.7 seconds.
- Average top speed over three trials on a straightaway: 116 mph.

The speedometer reads up to 120 mph. Our highest top speed was 118. At this point, we bottomed going over a bump. Chances are this car will do 120 plus.

With both cars, we found the brakes fade to the floorboard after seven stops.

Pontiac has fairly stiff springs which makes for a jouncy ride, particularly over slightly rough roads. It does have quick steering wheel response, and a minimum amount of sidesway hitting into the corners.

Summary—Pontiac is one of the best performing cars on the road in its price class. It should be a good buy for the driver who likes performance more than style.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
2 Mo. Total	1,213,187	1,167,674
March		575,260
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Feb. 9	147,163	136,308
Feb. 16	145,846	128,320
Feb. 23	138,938	125,537
Mar. 2	140,362	132,889
Mar. 9	141,268†	132,840
Mar. 16	141,000*	131,207

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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Carbon-Mo.	Sicromo 2½	Sicromo 5MS	25-20
DM-2	2½% Cr.-1% Mo.	Sicromo 7	25-12
Silmo	Sicromo 3	Sicromo 9M	35-15*
DM	4-6% Cr.-Mo.	18-8 Stainless	16-25-6*
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	

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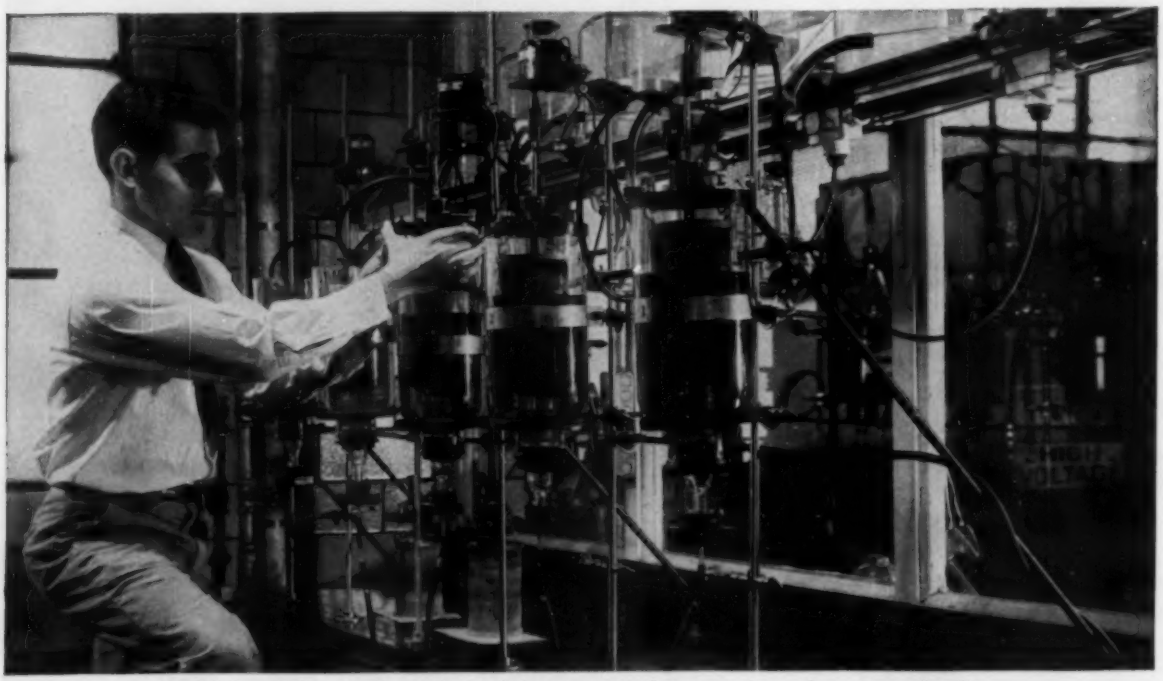

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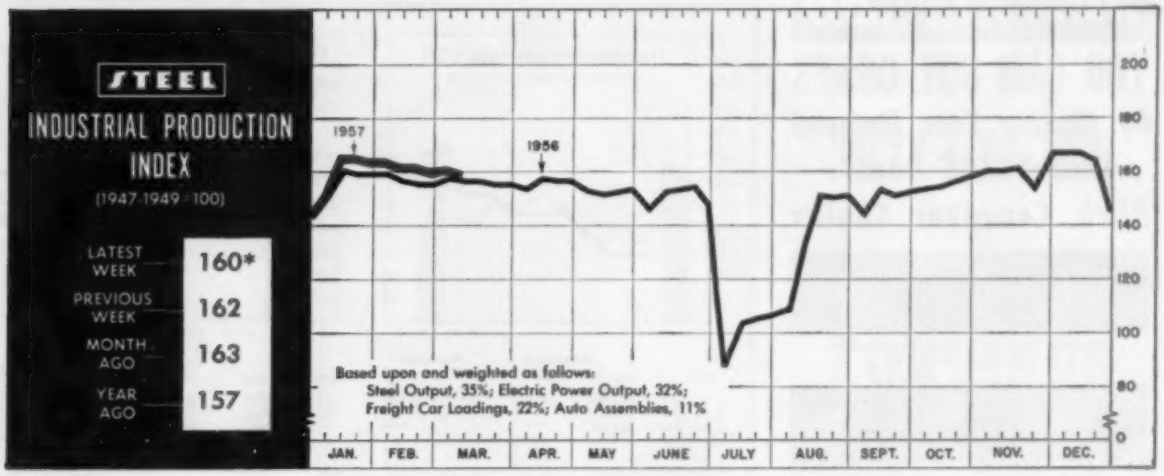

*Week ended Mar. 9.

Construction Builds Strength Into Economy

CONSTRUCTION is going to be as strong a factor in the nation's economy as it was in 1956 and 1955 when it was one of the biggest props under the boom. This year it will account for almost 11 per cent of a gross national product of $430 billion to $435 billion.

Although reports covering the first two months of 1957 do not give them clear-cut support, construction experts declare they see nothing to dull their optimism for the near or distant future. F. W. Dodge Corp., in its annual forecast made late in 1956, predicted a 6 per cent increase in dollar value for the industry this year. That would mean an increase of about 3 per cent in physical volume. Dodge is standing pat on that estimate.

Rule of Thumb—It has been said that this country has never had a major economic decline while construction was booming. If 1957 pans out as predicted, it would mean an outlay of close to $47.4 billion for all types of construction, up $2.7 billion from the record 1956 figure.

The Commerce and Labor departments report that construction put in place during January and February was valued at $5.934 billion, an increase of 3 per cent over the corresponding 1956 months. This represents an annual rate of $44.7 billion on the basis of two of the poorest building months of the year. Government figures are the result of contracts awarded many months ago

Future Business—The Dodge organization pegs January awards for future construction at a level 4 per cent above that of the year-ago period. *Engineering News-Record* points out that even though its tabulation of awards for heavy construction lags 1956 by 18 per cent through the first two months, it is still the second best January-February period on record. Bookings for fabricated structural steel dipped in January, but they still exceeded shipments, resulting in a continuation of the uptrend in the industry's backlog, says the Amer-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,373[1]	2,411	2,477
Electric Power Distributed (million kw-hr)	11,750[1]	11,791	11,133
Bituminous Coal Output (1000 tons)	9,795[1]	9,850	9,880
Petroleum Production (daily avg—1000 bbl)	7,500[1]	7,519	7,162
Construction Volume (*ENR*—millions)	$320.4	$321.2	$413.8
Auto, Truck Output, U. S., Canada (*Ward's*)	171,409[1]	172,816	165,403
TRADE			
Freight Car Loadings (1000 cars)	690[1]	704	698
Business Failures (Dun & Bradstreet)	284	300	293
Currency in Circulation (millions)[3]	$30,566[1]	$30,544	$30,202
Dept. Store Sales (changes from year ago)[3]	−4%	+3%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,174	$19,449	$21,106
Federal Gross Debt (billions)	$272.6	$276.2	$280.0
Bond Volume, NYSE (millions)	$20.5	$17.6	$25.6
Stocks Sales, NYSE (thousands of shares)	9,048	8,259	14,177
Loans and Investments (billions)[4]	$85.0	$85.1	$84.2
U. S. Govt. Obligations Held (billions)[4]	$25.7	$25.8	$28.3
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.10	209.10
STEEL's Nonferrous Metal Price Index[6]	239.6	239.1	277.5
All Commodities[7]	116.8	116.9	112.4
Commodities Other Than Farm & Foods[7]	125.4	125.4	120.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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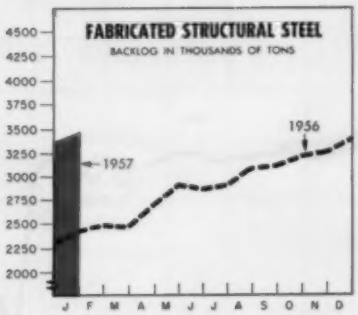


	Shipments 1957	Shipments 1956	Backlogs 1957	Backlogs 1956
Jan.	262.2	251.5	3,476	2,408
Feb.	....	255.4	....	2,476
Mar.	....	306.8	....	2,463
Apr.	....	289.6	....	2,687
May	....	306.2	....	2,896
June	....	284.7	....	2,859
July	....	165.5	....	2,904
Aug.	....	213.5	....	3,076
Sept.	....	240.9	....	3,108
Oct.	....	287.6	....	3,215
Nov.	....	276.0	....	3,252
Dec.	....	297.8	....	3,373
Total	....	3,205.5		

American Institute of Steel Construction.

	1957	1956	1955
Jan.	259.3	245.5	140.9
Feb.	....	256.2	148.5
Mar.	....	276.5	172.8
Apr.	....	264.7	179.8
May	....	275.6	205.2
June	....	245.4	193.5
July	....	286.7	201.7
Aug.	....	219.5	217.6
Sept.	....	230.5	246.5
Oct.	....	299.8	227.6
Nov.	....	216.2	210.4
Dec.	....	235.7	245.8

American Gear Mfrs. Assn.

Charts copyright, 1957, STEEL.

ican Institute of Steel Construction Inc. (See chart above.)

The "rolling adjustment" which has characterized the economy for several years is going to be a feature of construction this year. Housing will still play a prominent part, although it is hard to predict the year on the basis of the winter months. Dodge predicted a 2 per cent increase in units for 1957, and it hasn't changed the figure. Most other estimates have been lower, but there is a growing feeling that the last half of 1957 will see a pickup which will keep housing starts above the 1 million mark. Industrial building will be close to the 1956 level—at worst it will be the second best year on record. Public construction will boom more this year than in the past, what with the beginning of the government's road building program and the constant pressure for school building. Earthwork, irrigation, drainage and waterwork construction is far ahead of the previous record, says *Engineering News Record.*

Consumer Potential Rises

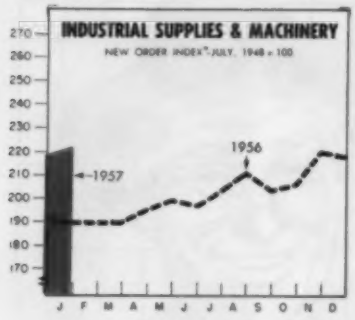
According to a recent survey by the American Management Association, consumer buying power in the economy as a whole is the principal economic indicator used in business forecasting. Three of the prime factors in determining that buying power are personal income, purchasing power of the dollar and the extent to which the consumer is willing to go into debt to get what he wants.

These facts should prove of value in forming your outlook:

1. Personal income in January was at a seasonally adjusted annual rate of $335.2 billion, $1 billion higher than in December, says the Office of Business Economics. The figure will climb as the cost of living advances and as automatic pay increases take effect this year.

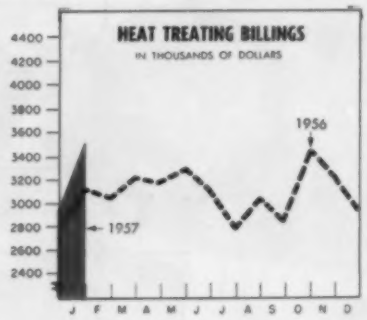
2. Even though the purchasing power of the dollar has decreased 16 per cent since 1947-1949, the average factory worker is getting enough extra dollars in his pay envelope to increase his purchasing power by 38 per cent over the base period.

3. Consumer credit, though high, is showing signs of leveling off. In December, it increased less than in the preceding two Decembers, and in January total consumer credit actually declined by almost $1 bil-



	1957	1956	1955
Jan.	221	190	160
Feb.	...	190	166
Mar.	...	190	171
Apr.	...	195	172
May	...	199	177
June	...	197	189
July	...	203	182
Aug.	...	211	186
Sept.	...	203	196
Oct.	...	206	195
Nov.	...	220	194
Dec.	...	218	191

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.



	1957	1956	1955
Jan.	3,496.7	3,116.4	2,181.0
Feb.	.....	3,045.2	2,184.5
Mar.	.....	3,226.2	2,599.5
Apr.	.....	3,172.0	2,579.5
May	.....	3,292.3	2,644.4
June	.....	3,094.5	2,645.1
July	.....	2,762.5	2,180.0
Aug.	.....	3,040.7	2,535.6
Sept.	.....	2,832.9	2,666.8
Oct.	.....	3,442.3	2,897.2
Nov.	.....	3,205.7	2,935.7
Dec.	.....	2,931.2	2,891.1

Metal Treating Institute.

lion. Most of the decline was seasonal, but there is increasing evidence that consumers are repaying debts at a faster pace than they have in the last few years and putting more into savings to be spent later on.

Sales, Orders Still High

Manufacturers' sales advanced to a new high of $29.1 billion on a seasonally adjusted basis in January, reports the Office of Business Economics. Both durable and nondurable goods shared in the improvement. New orders continued to come in at the high rate of $28.8 billion, the same figure reported in December. But durable goods dipped from $14.5 billion to $14.3 billion, seasonally adjusted. New orders and sales of durable goods canceled each other out, leaving unfilled orders at the December level of $59.4 billion.

Index Follows 1956 Pattern

STEEL's industrial production index is following the pattern set a year ago—although the line is 2 to 4 percentage points higher (see chart, page 71). If this pattern persists, there will be a gradual downtrend until the third quarter, with upward fluctuations around April or May. The total effect will still be a record first half. The scare talk of several weeks ago seems to be giving way to talk of a high but level first half followed by a moderate rise in the second half.

The most significant feature of the index is the decline in steelmaking operations in the last three weeks. The American Iron & Steel Institute estimates that steel mills produced 2,373,000 net tons of steel for ingots and castings during the week ended Mar. 17. While this is the lowest level since the steel strike last year—with the exception of the Christmas week—it is still more steel than was produced in most 1955 weeks and many 1956 weeks.

The other three elements of the index are holding steady and will continue to do so until late spring or early summer. Sales of new autos in January-February lagged behind the year-ago period by 38,000, but February closed out at a fast pace. The 21,700 daily average for the last ten days was the highest figure since the end of June, 1956, says *Ward's Automotive Reports*.

Here's why you can rely on WILLIAMS for DROP FORGINGS

When leading concerns keep coming to WILLIAMS for custom forgings (and they have for over half a century) ... you can be very sure there are good reasons why.

Here are a few:

- Adequate varied equipment to handle complex or simple jobs in short or long runs ... efficiently.
- Ability to forge aluminum, brass, bronze, carbon, alloy and stainless steel, titanium and monel in most shapes and in weights up to 250 lbs. (steel).
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- Machining facilities for milling, drilling, turning and broaching ... and complete die sinking facilities.
- A reputation for designing, engineering and forging even the toughest jobs to a high degree of accuracy.

Investigate all of the advantages you can receive when you look to Williams for Drop-Forgings. Your inquiry will receive prompt attention.

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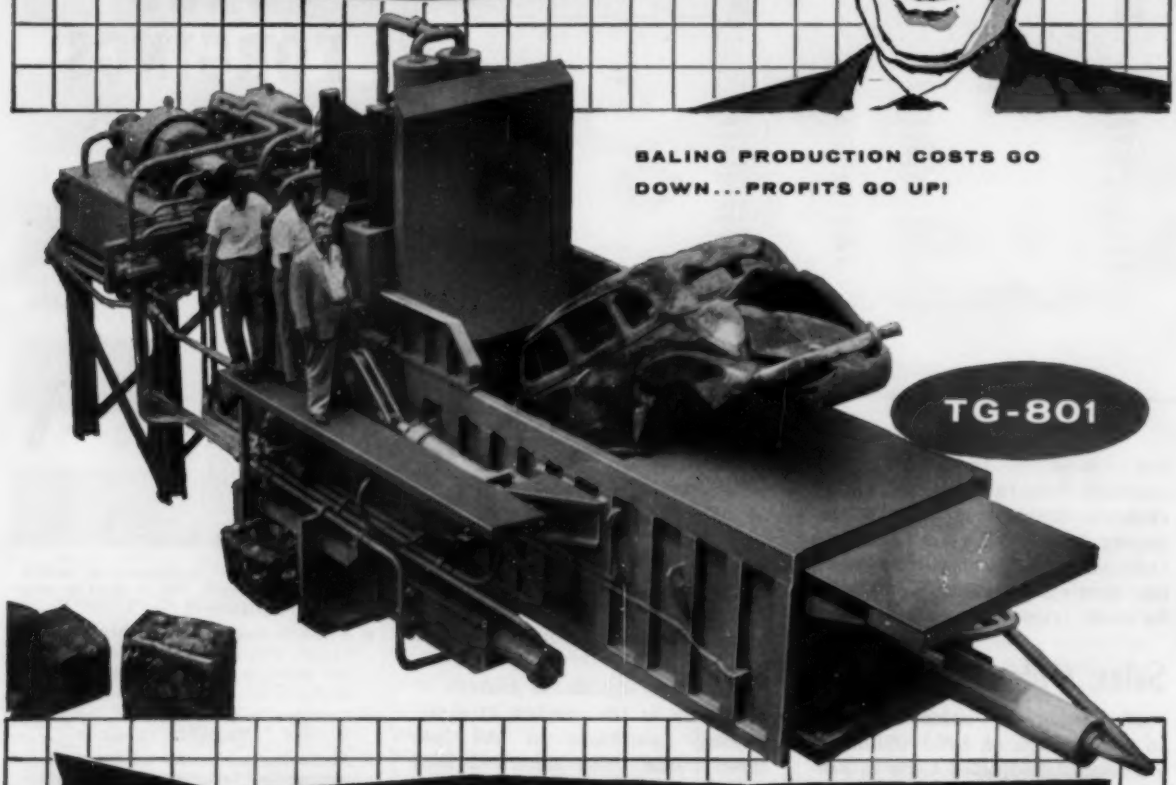

TG-801 is the workhorse of the industry. The charging box is 76" wide x 62" deep x 120" long. This handles whole bodies with frame. Bales come out without lip or chair-back at the rate of 15 tons per hour. If you are handling, or plan to handle this type of scrap **TALK WITH A MAN FROM HARRIS.**

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HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA

CYRUS HOUGH
Bellevue Indus. Furnace v. p.

JAMES E. HOVIS
Gas Machinery appointment

BERNARD R. WEBER
Fulton Co. v. p.

E. W. RUHE
Olin Mathieson post

Cyrus Hough was made vice president-engineering, **Bellevue Industrial Furnace Co.**, Detroit. He was chief engineer. Before joining Bellevue in 1955, he was with Libbey-Owens-Ford Glass Co. in charge of design and development of glass bending furnaces, grinding and polishing equipment, and special machinery.

James E. Hovis was made manager, industrial furnace division, **Gas Machinery Co.**, Cleveland. He previously managed sales engineering for steel mill furnaces. He now directs sales as well as engineering, manufacturing and installation of Gasmaco furnaces.

Thomas F. Gallagher was made Chicago district sales manager, **Laclede-Christy Division**, H. K. Porter Company Inc.

Charles J. Wacker was made sales manager, stampings division, **Sterling Tool & Mfg. Co.**, Milwaukee.

William J. Laughlin fills the new post of industrial division manager at **Thor Power Tool Co.** He is in Chicago. Former Los Angeles branch manager, he is succeeded by **Clarence H. Gabriel. Mark A. Sorenson** was made Denver manager; **John L. MacDonald**, Philadelphia manager.

Ralph L. Mudge was made Detroit plant manager; **Rex E. Ramsey**, assistant to the general manager, Detroit division, **Burroughs Division**, Burroughs Corp. **Albert C. Williamson** was made manager of engineering.

Bernard R. Weber was elected vice president for engineering and manufacturing at **Fulton Co.**, Milwaukee. He was chief engineer.

Roy E. Hess was made New York district manager, **Transue & Williams Steel Forging Corp.**, Alliance, O. **Bruce Thompson** was named assistant to the manager of forging sales division. **Bruce Wiegel** was made assistant to the manager, stamping sales division, succeeding the late **Hal Bonner**.

Lynn F. Jorgenson was named Chicago sales manager and manager of the sales training program at **Rolled Steel Corp.**, Skokie, Ill.

A. R. Schneller was named sales manager of welding products and accessories for the welding products division, **A. O. Smith Corp.**, Milwaukee. He is succeeeded as eastern regional sales manager for welding products by **D. H. Buerkel**, former sales representative in the Philadelphia area.

Progressive Welder Sales Co., Detroit, named **Irving L. Pond** sales manager, Frostrode Division, replacing **L. F. Van Nortwick**, now general sales manager of the company. Mr. Van Nortwick replaced **George W. Enk**, who joined Progressive's field organization.

Richard A. Villacres was named manager of a newly formed west coast branch for warehousing and service by **Huck Mfg. Co.** at Los Angeles. He is assisted as order department manager by **Edward A. Kruse.**

E. W. Ruhe was made Roll-Bond manager of the western brass mills division, **Olin Mathieson Chemical Corp.**, at East Alton, Ill. He was Roll-Bond production manager.

F. Burrows Esty, chief engineer, and **Ray J. Fellows**, sales manager, were elected vice presidents of **Wisconsin Motor Corp.**, Milwaukee.

Miller Falls Co., Greenfield, Mass., appointed **Arthur E. Ackerman** general sales manager. He succeeds **Clarence W. Otto**, retired vice president-general sales manager. Mr. Ackerman was assistant sales manager.

E. H. Sangwine was made manager of **Kaiser Aluminum & Chemical Corp.'s** new alumina and caustic chlorine production facilities now under construction near Gramercy, La. He is replaced as works manager of the Chalmette, La., reduction plant by **Walter H. Bast.**

Frederick M. Jackson was named vice president-sales; **George E. McDonald**, vice president-treasurer, **Walworth Co.**, New York.

Reynolds Metals Co. named **Fred H. Edgar** industrial sales manager-automotive at Detroit to head the new grouping of automotive technical and sales personnel.

Thomas J. McLoughlin joined **M. H. Detrick Co.**, Chicago, as consultant to the open hearth and steel mill departments. Mr. McLoughlin is a retired operating executive of U.S. Steel Corp. and former chairman of American Iron

GEORGE H. McKAIG

JAMES T. JONES

appointments at Hughes Aircraft

LEROY E. BONNETTE

CARL W. LINDAHL

promotions at Denison Engineering

& Steel Institute's technical committee on open hearth steelmaking.

Hughes Aircraft Co. appointed **George H. McKaig** manager-production planning; **James T. Jones,** manager - production engineering at its El Segundo, Calif., plant. Mr. McKaig was chief, test equipment engineering. Mr. Jones was manager, inspection and testing.

R. W. Wilson was made Chicago district manager, **Electro Metallurgical Co.,** division of Union Carbide & Carbon Corp. **F. W. Hanson** was made Houston district manager.

Robert G. Shrake was made Buffalo district sales manager, **Republic Steel Corp.** He succeeds **J. P. MacLean,** resigned.

G. A. Romary was made sales manager, **Wagener Pump Division,** Canton Stoker Corp., Canton, O. He will supervise both U.S. and foreign sales offices.

Harold C. Miller joined **Super-Cut Inc.,** Chicago, as chief research engineer. He was with Armour Research Foundation, serving as manager of the outside patent division.

James P. Boyle was made assistant sales manager, time equipment division, **International Business Machines Corp.,** New York.

Pesco Products Division, Borg-Warner Corp., Bedford, O., promoted **James R. Becker** to assistant sales manager, aircraft pumps and accessories.

E. J. Lavino & Co., Philadelphia, elected **John O. Lorange** vice president in charge of blast furnace operations; **Lawrence C. Steele,** assistant vice president-blast furnaces.

H. E. P. Barta was made manager of project engineering sales division, **Pfaudler Co.,** Rochester, N. Y.

Milwaukee Malleable & Grey Iron Works, Milwaukee, elected **Joseph B. Gutenkunst** president-treasurer to succeed his brother, the late **Charles A. Gutenkunst Jr.**

Antoine Predock succeeds the late **Jack A. Kelly** as manager of plant engineering and maintenance for **Bell Helicopter Corp.,** Ft. Worth, Tex.

Harold Rosoff was named sales manager, **Ledeen Mfg. Co.,** El Monte, Calif.

H. E. Pollard was made chief engineer, **Lindberg-Fisher Division,** Lindberg Engineering Co., Chicago.

Samuel Moore & Co., Mantua, O., appointed **Richard A. Matthews** project engineer. He was vice president of Fenlon Inc.

Douglas R. Hortvet was made chief engineer of **A. O. Smith Corp. of Texas,** Houston, joint subsidiary of A. O. Smith Corp., Milwaukee, and Armco Steel Co. Mr. Hortvet was assistant chief engineer.

Jules Horelick was made staff executive assistant to the president of **Allied Research Products Inc.,** Baltimore. He was manager of the subsidiary, Allied Metal Finishing Corp.

Leroy E. Bonnette was made chief engineer; **Carl W. Lindahl,** director of purchasing at **Denison Engineering Division,** American Brake Shoe Co., Columbus, O. Mr. Bonnette was chief development engineer. Mr. Lindahl was executive assistant to director of engineering.

Leon H. Fish was named assistant to the president of **Acme Precision Products Inc.,** Dayton, O.

Sydney A. Skillman was elected vice president-general sales manager, **Studebaker-Packard Corp.,** South Bend, Ind.

Flintkote Co. appointed **W. Leon Harper** sales manager for both the industrial products and Tile-Tex divisions. He has headquarters in New York.

Milton P. Gussack, sales director for Grant Pulley & Hardware Corp., was appointed national sales manager for **General Bearing Co. Inc.,** Mineola, N. Y.

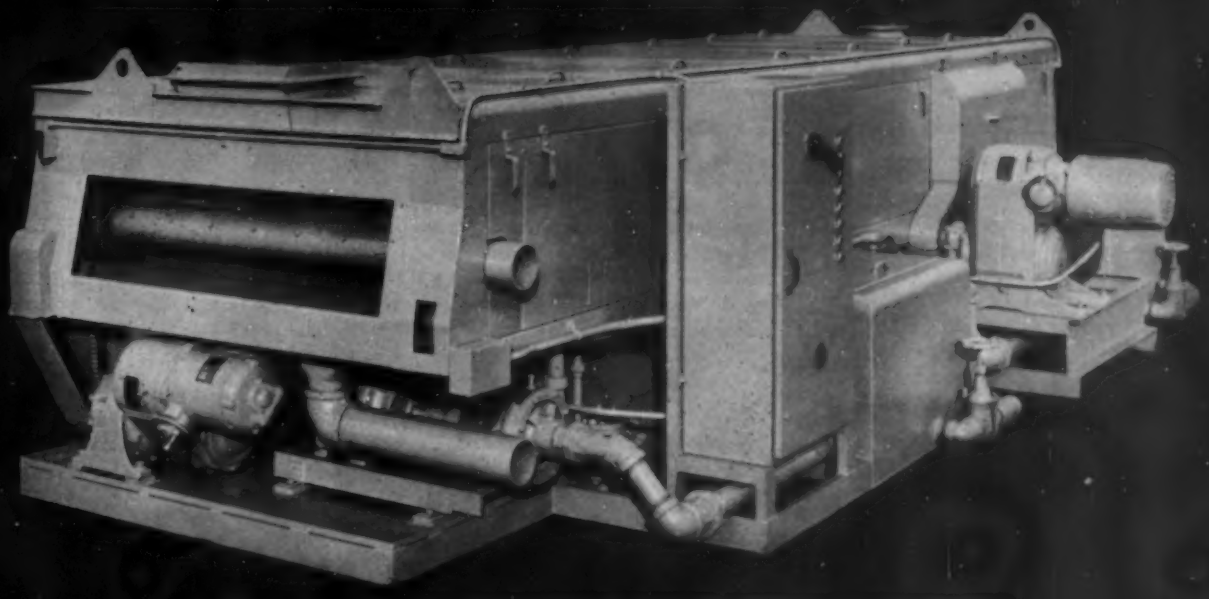
Jack Grant was appointed administrative assistant to the president of **Pennsylvania Engineering Corp.,** New Castle, Pa. He continues to serve as a sales engineer.

Norton Co. appointed **Norman R. Ekholm** district manager in Atlanta; **John R. H. Truelsen,** district manager in Indianapolis. Both appointments are effective Apr. 1.

Thomas M. Hogan was made assistant district sales manager in New Orleans for **Jones & Laughlin Steel Corp.**

Hiram Brown was made technical

Compact Design Eliminates Space Wasting Bulk



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SAVE VALUABLE PLANT FLOOR SPACE

This compact Sheet Washer speedily cleans sheet steel after polishing. A comparative "shorty" in length, it handles sheets at high speeds . . . operating efficiently at a 75 ft. per minute gait. P-D equips this Power Spray Sheet Washer with a powered roller conveyor, a powered brush, and a high pressure blow-off. Because of careful designing, it functions successfully in an area much smaller than ordinarily required for this type operation.

For more than a quarter century PETERS-DALTON experts have proved their designing and engineering skill. Washers of all sizes, types and required uses, can be designed and built to meet your needs . . . from a single unit to a complete installation. You can depend on P-D to give the services and production you have the right to expect. Just write, wire or phone. We'll be glad to tell you more.

Representatives in principal cities.

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- *Industrial Washing Equipment*
- *Drying and Baking Ovens*
- *Hydro-Whirl Dust Collecting Systems*

E-3/57

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A SUBSIDIARY OF DETROIT HARVESTER CO.
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D. R. MATHEWS
Alan Wood gen. supt.

DALTON H. MILLER
Industrial Tectonics mgr.

BERTRAM A. KLINE
Birdsboro Steel post

adviser to the Des Moines, Iowa, plant manager, **Solar Aircraft Co.**

D. R. Mathews was made general superintendent of primary production at the open hearth, coke and chemicals, and blast furnace departments of **Alan Wood Steel Co.**, Conshohocken, Pa. He is replaced as open hearth superintendent by **J. H. Cain**, former assistant superintendent.

Industrial Tectonics Inc., western division, appointed **Dalton H. Miller** general manager for its recently completed special bearing plant in Compton, Calif. He was formerly a consulting engineer for Albert Ramond & Associates, Chicago.

E. Jack Barbeau was elected president-general manager, **McKinnon Industries Ltd.**, St. Catherines, Ont., General Motors Corp.'s Canadian parts and accessory manufacturing subsidiary. The appointment is effective Apr. 1. Mr. Barbeau will succeed **Edwin H. Walker**, elected president of General Motors of Canada Ltd., Oshawa, Ont.

A. A. Garthwaite Jr. was elected president, **Lee Rubber & Tire Corp.**, Youngstown. He succeeds his father, **A. A. Garthwaite**, now chairman.

Elbridge F. Rauscher was named manager of the mobile home air conditioning department of **Carrier Corp.**, Syracuse, N. Y. He succeeds **James C. Patterson**, retired.

James S. Hurlburt was made manager of **General Electric Co.'s** construction materials division-southwestern district at Houston. He succeeds the late **Charles W. Maledon.**

Bertram A. Kline was elected assistant vice president and sales manager, **Birdsboro Steel Foundry & Machine Co.**, Birdsboro, Pa. He was sales manager, steel castings and miscellaneous machinery division, and general advertising manager.

John B. Owen was made an assistant sales manager for **Republic Steel Corp.'s** alloy steel division, Massillon, O.

Nicholas J. Bouras was made manager, reinforcing bar division, **U.S. Steel Supply Division**, U.S. Steel Corp., at Newark, N. J.

Oilgear Co. appointed **Ewald H. Parduhn** manager of the newly opened Buffalo district office.

At the Sault Ste. Marie, Mich., plant of **Electro Metallurgical Co.**, division of Union Carbide & Carbon Corp., **H. A. McPherson**, superintendent, was named assistant to the works manager. **J. H. Smallridge** was made superintendent; **S. L. Slater**, assistant superintendent, power and calcium carbide operations.

K. E. Kiess was made works manager, Findlay, O., division, **Gar Wood Industries Inc.**

Arthur F. Erwin was made engineer in charge of a new nuclear pump section at **Allis-Chalmers Mfg. Co.**, West Allis, Wis.

Rudolph B. Flershem was made chairman of **Buffalo-Eclipse Corp.**, North Tonawanda, N. Y. He was president of both Buffalo-Eclipse and its Buffalo Bolt Division and continues as chief executive officer. **C. Neal Turner** was made president of both Buffalo-Eclipse and Buffalo Bolt. He was vice president of the corporation and president of its Eclipse Lawn Mower Division in Prophetstown, Ill.

Loren W. Smith was made assistant vice president and director of metallurgical development of **Symington-Gould Corp.**, Depew, N. Y. He has served 14 years with Cornell Aeronautical Laboratory, Buffalo, as head of the metallurgy section, materials department.

John F. Hoffman was made assistant superintendent of **Kaiser Steel Corp.'s** electric weld pipe mill, Fontana, Calif. He was tubular engineer.

Experiment Inc., Richmond, Va., elected **Jerry A. Burke Jr.** executive vice president; **Robert L. Wolf**, vice president in charge of technical operations.

Addison Davidson Jr. was made eastern district sales manager for **Femco Inc.**, with headquarters at Quakertown, Pa.

Edward G. Lommel was made plant engineer, Detroit Transmission Division, **General Motors Corp.**

OBITUARIES...

Robert K. Beck, 54, executive vice president, **Brush Beryllium Co.**, Cleveland, died Mar. 9.

Albert W. Miller Jr., 53, a founder and chairman of **Portable Electric Tools Inc.**, Chicago, died Mar. 5.

William L. Neilson, 78, vice president, **Norton Co.**, Worcester, Mass., died Mar. 6.

Walter E. Baker, 61, vice president, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa., died recently.

Paul W. Grace, assistant to the president, **Capewell Mfg. Co.**, Hartford, Conn., died Mar. 3.

Joseph F. Joy, 73, founder of **Joy Mfg. Co.**, Pittsburgh, died recently in Pierce, Fla.

Barry J. McNulty, 66, former president, **Baron Steel Corp.**, San Diego, Calif., died Feb. 27.

Archibald M. Russel, chairman, **Hugh Russel Sons Ltd.**, Montreal, Que., died Mar. 1.

VANADIUM-ALLOYS STEEL COMPANY

FIRST QUALITY

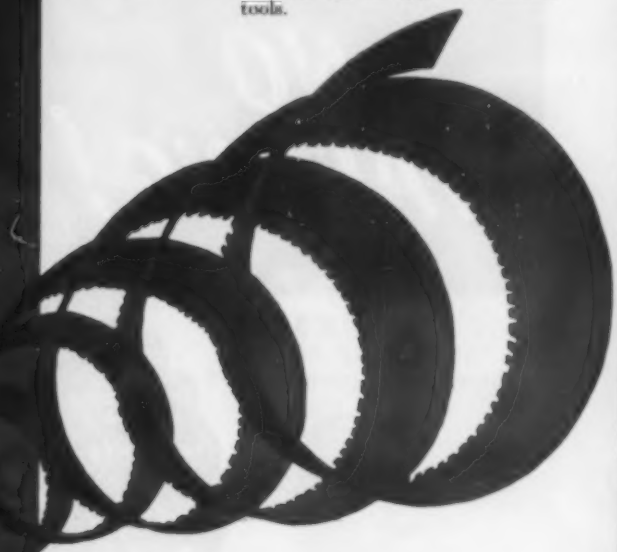
High Speed Steels

wherever outstanding cutting performance must be matched with practical economy on industry's most exacting jobs

Vasco Supreme — The supreme high speed steel, providing highest hardness, highest hot hardness, highest wear resistance, highest cutting efficiency. (U.S. Pat. 2,174,285)

Neatro — For heavy, light and intermittent cuts on heat-treated steels and abrasive materials. Extremely high abrasion resistance, exceeded only by Vasco Supreme. (U. S. Pat. 2,174,286)

Van Cut — Molybdenum-tungsten type, combining ease of grinding with improved wear and heat resistance. Suitable for all types of cutting tools.



Red Cut Superior — America's favorite general-purpose high speed steel. Easy to fabricate, simple to heat treat. Wide choice of carbon content, for almost limitless uses.

Vasco M-2 — The original 6-6-2 type steel. Machines easily, has wide hardening range, can be ground normally when hardened. Excellent economy in general service.

8-N-2 — Molybdenum type, low in tungsten. High toughness, for fine edged tools and sharp angles without chipping or crumbling. Substitutes well for 18-4-1.

Van-Lom — Out-cuts other high-moly steels. Special vanadium content permits increased carbon (U. S. Pat. 2,105,114) without brittleness, for greater toughness, wear resistance.

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NO REBORING—

NO KEYSEATING—

NO MACHINING—

NO WAITING!

TAPER-LOCK SPROCKETS
SINGLE AND DOUBLE STRAND!

NOW Taper-Lock *Double* Strand Sprockets are available—from stock—ready for the shaft without re-machining!

They offer all the advantages of Taper-Lock mounting. Easy on! Easy off! Precision machined at the factory, they come to you with accurate, concentric bores—insuring full contact between hub and shaft. Taper-Lock grips with the firmness of a shrunk-on fit!

There is no flange, no collar, no protruding part. Flush design means *safety*... If the sprocket becomes worn, you replace only the tooth part. The bushing is used again and again. And Taper-Lock bushings are interchangeable in Dodge Taper-Lock Sheaves, Couplings and Conveyor Pulleys!

Taper-Lock Sprockets and Dodge Roller Chain (made to ASA standards) are stocked by Dodge distributors. Single Strand sizes range from No. 40 to No. 160, up to 112 teeth; Double Strand from No. 40-2 to 80-2, up to 102 teeth. Write for Bulletin A-644 containing selection, installation and maintenance data.

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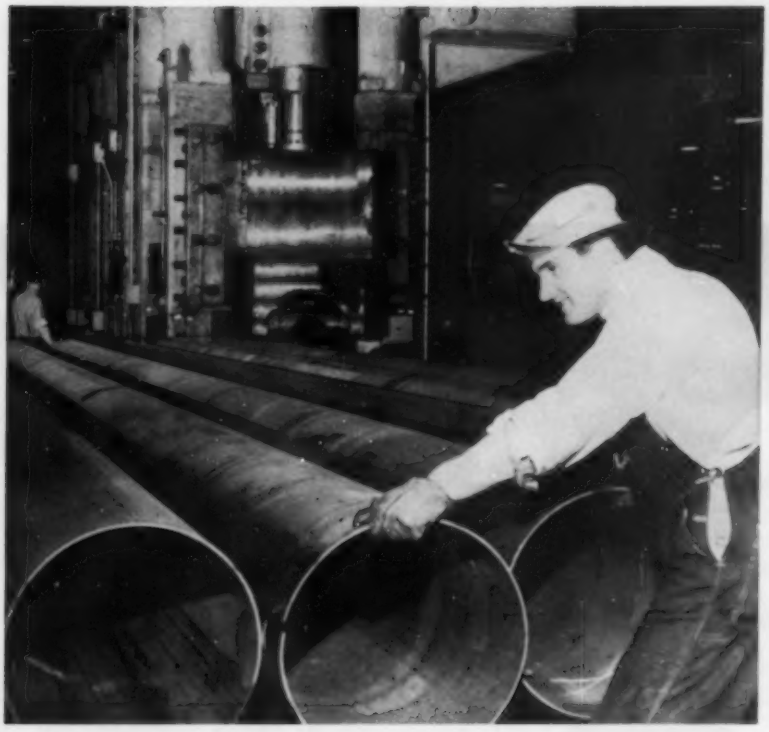
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new methods. Look for his name under "Power Transmission Machinery" in your classified phone book, or write us.

TAPER-LOCK CHAIN COUPLINGS

Accommodates common minor shaft misalignments. Provides strong, compact coupling. Available with covers, for appearance, safety, dirt protection and lubrication—which increases coupling life.



Pipes ranging up to 36 in. OD start rolling from . . .

Canada's First "Big-Inch" Mill

HUGE steel pipes are beginning to come off the assembly lines at Welland Tubes Ltd., Welland, Ont. The new mill can turn out pipes which are 3 ft in diameter and about as long as a boxcar.

The mill has an annual capacity of 200,000 to 300,000 net tons, with sizes ranging from 20 to 36 in. OD. At peak capacity, it could produce more than 3 miles of pipe daily.

An 800-ton press shapes big plates with the ease of a man rolling a cigarette. It is capable of exerting up to 16,500 tons of pressure. Pipe in the foreground of the above picture is 20 in.

Will Cut Imports — It is Canada's first "Big-Inch" pipe mill. Previously, the biggest steel pipe made in that country (16 in.) was produced by Page-Hersey Tubes Ltd.

Initial production of the $10-million Welland Tubes plant — a joint project of Page-Hersey and the Steel Co. of Canada — will consist of 150 miles of 20-in. pipe. Interprovincial Oil Pipelines Ltd. will use it to extend a line from Sarnia to Port Credit, Ont. Officials estimate this order will keep the mill busy for about three months.

After that, the company expects to start producing the first part of a multimillion dollar order placed by Trans-Canada Pipelines Ltd. It's for sections of a 2200-mile natural gas line between Winnipeg, Man., and Montreal, Que.

Welland Tubes officials expect most of the production will be used in major oil and gas lines across the country. "But there are definitely other uses for the

(*Please turn to page* 85)

DODGE PRODUCTS you should know

FLEXIDYNE
THE DRY FLUID DRIVE
100% efficiency at full load!

TORQUE-ARM
SPEED REDUCERS
Cost less — deliver more!

DODGE-TIMKEN
America's Quality Pillow Blocks!

DODGE BULLETINS YOU SHOULD HAVE—

- Flexidyne Dry Fluid Drives and Couplings. Bulletin A-640-A.
- Torque-Arm Speed Reducers. 15 sizes—1 to 90 hp. Bulletin A-637.
- Roller Bearings. Load ratings, dimensions, etc. Bulletin A-638.

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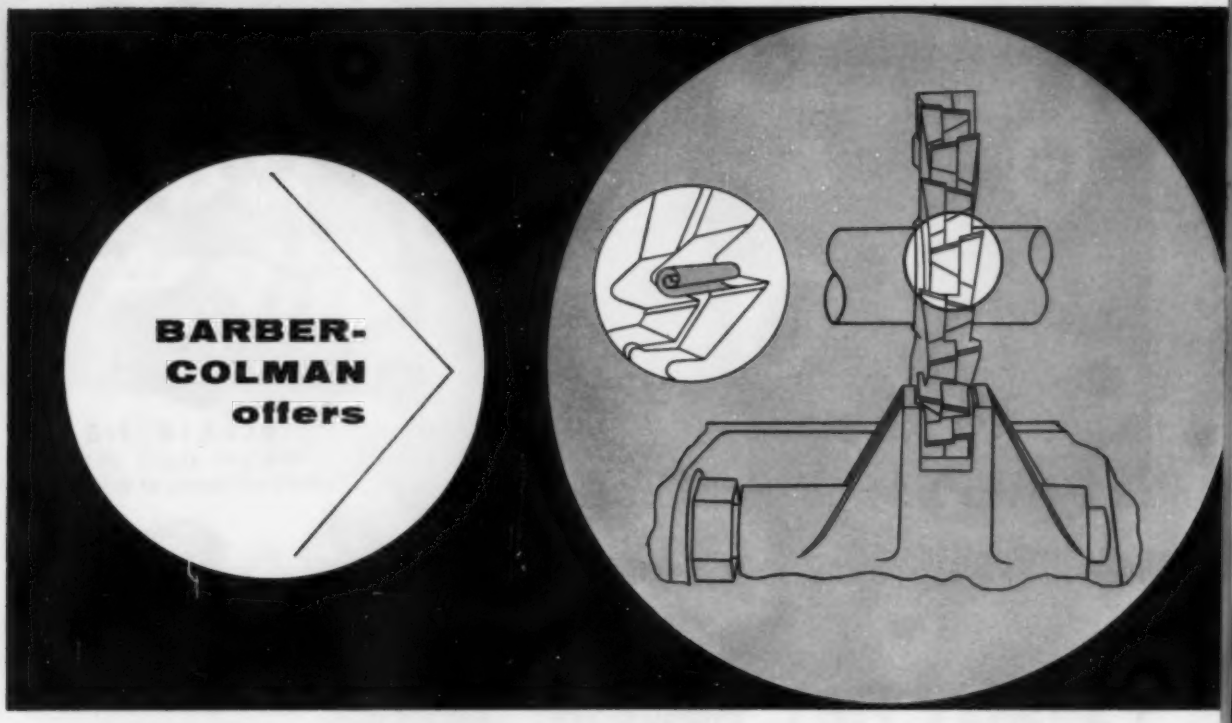
DODGE
of Mishawaka, Ind.

top cutter design improves cutting efficiency and tool life



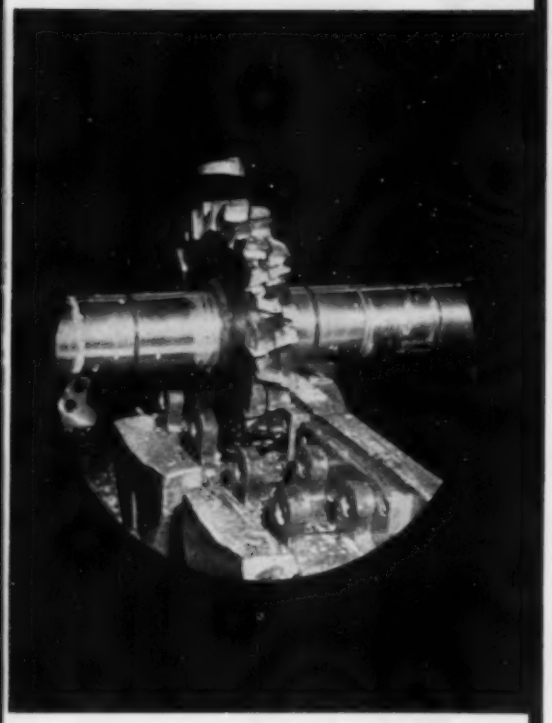
free-flow of chips across cutter face for reduced tooth breakage and increased feeds and speeds *

Improved performance and tool life are provided by these Barber-Colman interlocking staggered-tooth side milling cutters* because chips flow freely across the face of the cutter teeth. The patented interlock of the teeth provides that the entering section of the tooth in the cut is always slightly ahead of the trailing portion so that there is no chance of piling up chips or blocking chip flow. Consequently, these cutters increase tool life and permit the use of greater feeds and speeds.

Cutters of this type are recommended for long deep slotting cuts in steel, shoulder cuts and for milling operations where depth of cut exceeds the width of the cutting face. They work equally well in steel or soft non-ferrous materials. The interlocking feature provides adjustment for accuracy and longer cutter life.

The operation shown here is milling a flywheel clutch cam at Caterpillar Tractor Co. A slot 1″ long x 1⅛″ wide x 1⅜₆″ deep is milled, removing .096″ stock from sides and bottom of cut.

* Patent No. 2,230,662



Compare these figures with operations in your shop:

Part.....Steel Forging, 241-285 Brinell
Cutter Speed.....54 sfm
Cutter Feed.....3.2"/min.
Pieces per Hour.....43
Pieces per Sharpening...344

increases feeds and speeds

Feeds and speeds which could stall conventional type cutters can often be used with this cutter design. The depth of cut may be as great as the depth of the cutter hub without impairing the efficiency of the cutters. Absence of chip accumulations reduces cutting temperatures to allow increased feeds and speeds.

lengthens tool life

This improved design eliminates any obstruction to the free flow of chips across the cutting face. Consequently, chip congestion found on cutters of conventional design is eliminated. Because of this chip action, cutting edges will produce many more pieces per sharpening. The absence of chip congestion also removes a major cause of tooth breakage.

guarantees accuracy

Through the interlocking feature, accurate slots can be milled throughout the life of the cutters. The width of conventional cutters becomes undersize with sharpening and they must be discarded or used for other work. The width of interlocking cutters, however, can be accurately controlled throughout the life of the cutters by using shims between the sections. Several widths of slot can be milled with the same interlocking cutter by using shims of varying thickness.

These special cutters are only one example of Barber-Colman cutter design, specifically suited to particular job requirements. When you have milling problems, consult Barber-Colman Cutter Engineers for recommendations. Send us blueprints or a trial order for your special cutter requirements. Get top cutting efficiency through top cutter design.

BARBER-COLMAN COMPANY

833 ROCK STREET • ROCKFORD, ILLINOIS

Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines

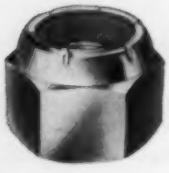
BARBER COLMAN

World's tallest pile driver...

World's toughest test rig...

for

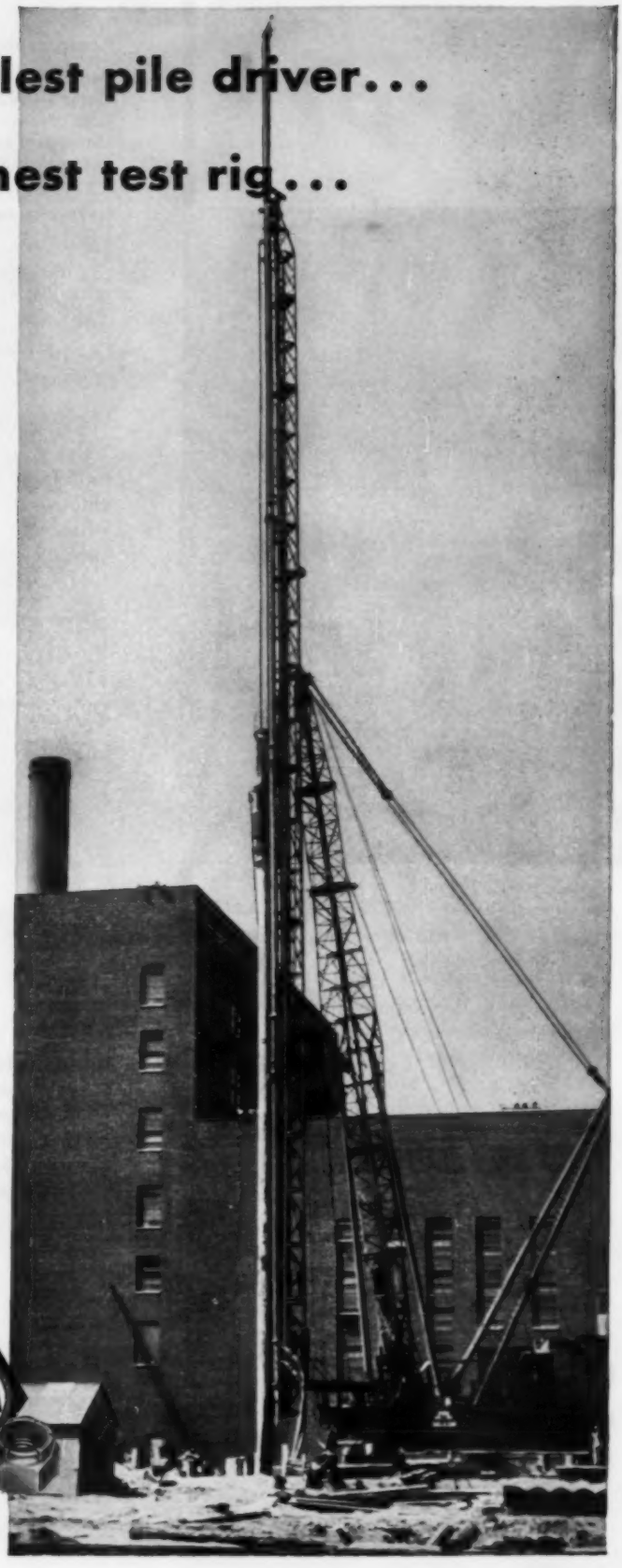
Elastic Stop® nuts



Each hammer-stroke of this 270-foot pile driver delivers a 24-foot-ton wallop! It was built by Raymond Concrete Pile Company to drive 200-foot pipe piles for the foundation of units being added to the B. C. Cobb Steam Plant of Consumers Power Company, at Muskegon, Mich.

Raymond makes a practice of using Elastic Stop® nuts for bolting together sections of leads and booms on all their pile-driving equipment. The red elastic locking collar of these vibration-proof fasteners has successfully maintained its grip under these severest of all vibration and impact conditions!

Whether used on aircraft or locomotives; guided missiles or steam shovels . . . more than twenty years of field testing on applications where safety and severe operating conditions demand a fastener that will not shake loose, prove that . . . *you can rely on Elastic Stop nuts.*



ELASTIC STOP NUT CORPORATION OF AMERICA

Department N77-360 • 2330 Vauxhall Road • Union, N. J.

The red locking insert in an Elastic Stop nut guarantees

- reusability
- vibration-proof locking
- thread sealing . . . no galling
- immediate identification
- adaptability to all shapes and sizes of threaded fittings
- suitability to production line assembly methods

(*Concluded from page* 81)

big pipe," a company spokesman commented. "It is likely, for instance, that water irrigation lines will increasingly create a need for sizes of steel pipe to be made at Welland."

Wheeling Opens Warehouse

Wheeling Corrugating Co., subsidiary of Wheeling Steel Corp., Wheeling, W. Va., opened its new warehouse at 1704 Kenny Rd., Columbus, O. G. M. Long is branch manager.

Forms American Hoesch Inc.

American Hoesch Inc. has been established as a sales subsidiary of Hoesch-Werke A.G. and Hoesch-Export G.m.b.H., Dortmund, West Germany. N. F. Gunther, president and general manager of American Hoesch, maintains offices in the Chrysler Bldg. East, New York 17, N. Y. Products offered include flat steel, wire and wire products, structurals, tubular and fabricated steel.

Awards Furnace Contract

McDowell Co. Inc., Cleveland, awarded a contract to Gas Machinery Co., Industrial Furnace Division, that city, to install an ignition furnace on the Dwight-Lloyd sintering machine designed for Franklin Smelting & Refining Co., Philadelphia.

Alcoa To Open District Office

Aluminum Co. of America, Pittsburgh, will occupy the first building in a $500,000 industrial development in Waltham, Mass. Ray E. Palmer is Alcoa's Boston district sales manager.

Fuller Enlarging Facilities

Fuller Co., Catasauqua, Pa., has begun a 50 per cent expansion of its manufacturing facilities in that city. The firm makes conveying systems, clinker coolers and heat recuperators, clinker breakers, vane and roll type material feeders, rotary valves, bulk cement unloaders and related accessories. The firm is a subsidiary of Gen-

(*Please turn to page* 89)

CUTTING plastic printing plates for textbooks . . .

"Tools" Create Everything --Even Educations

39,000,000 students in America today. It takes a lot of goods to educate them. Tons of textbooks, for example.

Paper mills and printing presses are some of the "tools" of textbook production. For example, bandsawing machines assist to speed output and keep costs down.

In the illustration above a band machine is trimming and beveling vinyl plastic printing plates. This job was once done with a circular saw. The DoALL bandsaw prevents "kick-back" accidents and does the job twice as fast. It formerly cost over $300 a year just for the circular saw blades consumed. Now the saw bands used cost less than $100 a year.

It is savings like these all through a manufacturing operation—whether textbooks or toasters—that add up to better, lower cost products for everyone.

Tools touch every phase of life. They provide the abundance of essential goods necessary for the home, school, church, hospital, theatre, museum, and art gallery.

And still the student population grows.

Everything we eat, wear and use, has been made, finished or transported with "tools". The quantity and quality of goods available is in direct ratio to the quantity and efficiency of our tools.

With new forms of basic equipment for sawing, grinding, lapping and gaging, The DoALL Company offers industry new and better tools that make other "tools" at lower cost than they can be made with any other equipment.

Reprints of this series on economics available for your employees.

SAVE WITH DoALL SAWING—learn how you can perform hundreds of machining operations on metals and non-metallics better, faster and cheaper with band machines. Ask for literature. Call DoALL locally or write.

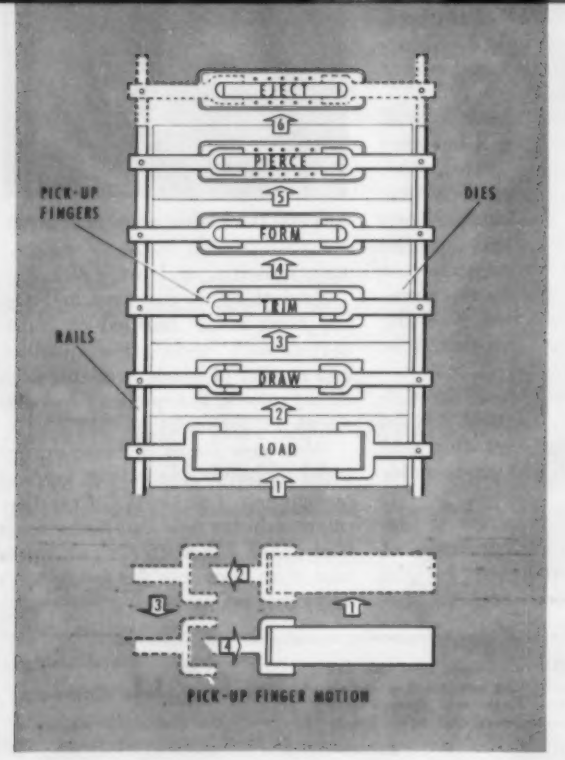
The DoALL Company

Des Plaines, Illinois

38 Local Sales-Service Stores E-23

AUTOMATE YOUR PRESS

Automobile oil pan produced from coil stock in six operations on straight side press. Press Pacer automatically transfers stampings from each die station to the next.



The Sheffield Press Pacer is a demountable mechanical transfer device which automates any straight side press with a bed area of 42" x 72" or larger and a shut-height of 14" or more. Moves stampings from one die to the next with each stroke of the ram—or from one press to the next.

The Press Pacer is completely mechanical in operation, being driven by means of a lever arm bolted to the ram. Suitable for all those jobs that cannot be handled on progressive dies.

In one instance, the Press Pacer enabled one press to handle three times the production turned out by six presses. In addition it eliminated work damage caused by moving parts from press to press.

WITHOUT RESTRICTING ITS USE TO ONE PRODUCT BY MEANS OF THE

SHEFFIELD PRESS PACER

Press Pacer automatically moves these torque tube flange stampings through 6 die stations on this large press.

COMPLETE FLEXIBILITY

The Press Pacer can be installed in a few hours and if any temporary emergency makes manual feeding imperative, it may be demounted within minutes and the press operated in conventional fashion.

The press may be fed either from front to back or from right to left.

Feed distance between dies can be varied between 8" and 36" on the standard unit.

Stroke adjustment of the standard unit has a range of 12".

Feed fingers and other elements may be readily revised to accommodate product changes.

Automatic loading, unloading and handling are all compatible with Press Pacer operation.

Before deciding on a change in your press equipment, find out how much a Press Pacer would save you.

Send your part prints, press information and production requirements to ***The Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 17.***

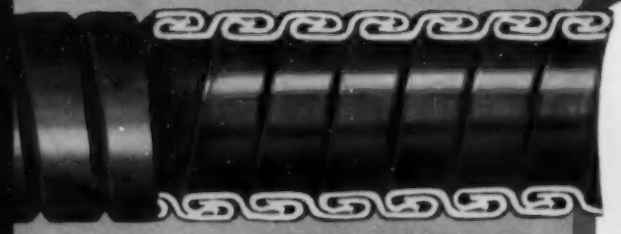
*Trade-Mark

the SHEFFIELD corporation

7721

TYPE FP WIRE BRAIDED

PENFLEX



HEAVY DUTY INTERLOCKED

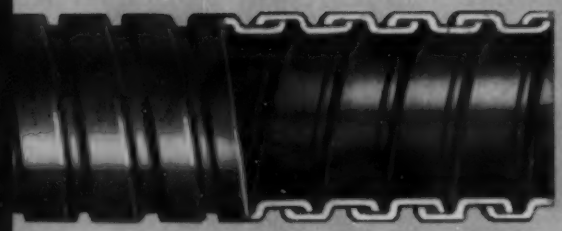
FLEXIBILITY

DEFIES HEAT...FATIGUE ABRASION...LEAKAGE

Penflex is ruggedly built hose with all of the flexibility required, plus the toughness and durability of metal. No matter how hot the material to be conveyed Penflex cannot be cooked like ordinary hose. It stubbornly defies rough abuse, abrasion and crushing.

From 1/8" I.D. to 24" I.D. . . . bronze, galvanized steel, or stainless steel . . . from an air compressor line to a diesel exhaust, Penflex makes them all for the steel industry. And Penflex "Flexineering"—the science of applying flexible tubing to fit the particular needs of the job to be done—assures the right tube in each installation. When you require tubing or hose that is tight as a pipe, but flexible . . . safe at high temperatures . . . and free from metal fatigue, specify Penflex.

Penflex manufactures a complete line of four wall interlocked and seamless welded corrugated flexible tubing for the steel industry. Write for your free copy of the booklet "Flexineering At Work."



LIGHTWEIGHT SQUARELOCKED
Unpacked, cord packed, light asbestos packed, heavy asbestos packed

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa. *Branch Sales Offices:* Boston • New York • Chicago • Houston • Cleveland Los Angeles and Distributors in Principal Cities

HEART OF INDUSTRYS LIFELINES

TWIN-LOK
Galvanized Lined
Stainless Steel Lined

METALLIC TUBING

(*Concluded from page 85*)

eral American Transportation Corp., Chicago.

Titan Metal Buys Press

Titan Metal Mfg. Co., Bellefonte, Pa., purchased a 1500-ton extrusion press from Sutton Engineering Co., Pittsburgh. It will be installed at Titan's new West Division plant at Newark, Calif., for the extrusion of brass and copper alloys.

Opens Tube Division

Epps & Co., steel warehouse firm, has placed in full operation its new Tube Mfg. Division, 5000 Pacific Blvd., Los Angeles. The firm offers welded steel tubing in sizes from $\frac{5}{8}$ to $2\frac{1}{2}$-in.

Buys Patenting Furnaces

H. K. Porter Company Inc.'s Leschen Wire Rope Division, St. Louis, awarded a contract to Gas Machinery Co., Industrial Furnace Division, Cleveland, to install a 60-ft wire patenting furnace with 30-ft lead quench and a 40-ft rod patenting furnace with 20-ft lead quench.

Carrier Redesignates Division

Carrier Corp. has changed the designation of its Day & Night Division to Day & Night Mfg. Co. The firm is at 700 Royal Oaks Dr., Monrovia, Calif.

Vickers Opens New Facilities

Vickers Inc., Detroit, has begun operation of its 130,000 sq-ft plant at Jackson, Miss. Air-borne hydraulic systems and components will be manufactured. The firm also has opened a new regional sales and service office at Albertson, Long Island, N. Y. George Tate has been named manager of this office.

NEW ADDRESSES

A. Milne & Co. Inc., distributor of solid and tubular tool steels, moved its general office headquarters to 67 W. 44th St., New York,

PHOTO COURTESY OF THE WALLINGFORD STEEL CO., WALLINGFORD, CONN.

CONTROLLED ACCURACY

to ±.0001 inch at 800 ft. per minute*

. . . WITH PRATT & WHITNEY AUTOMATION GAGING

Here's an automation gaging installation which provides fully automatic correction of a mill that rolls at speeds of more than 800 feet per minute and produces steel strip as thin as 0.002". Results that rate a mention — and your consideration — include . . . greater accuracy . . . finer product quality . . . lower production costs . . . and the near-elimination of scrap losses.

Whether your interest is continuous or parts production, Pratt & Whitney Automation Gaging can play an important role in improving your product quality and reducing your unit costs by increasing your units per production hour.

**Equal to 1/30th the thickness of a human hair.*

Write for additional information
Pratt & Whitney Company, Incorporated
13 Charter Oak Boulevard, West Hartford, Conn.

GAGE BLOCKS . . . STANDARD MEASURING MACHINES . . . SUPERMICROMETERS . . . COMPARATORS
CONVENTIONAL GAGES . . . THREAD COMPARATORS . . . AUTOMATION AND CONTINUOUS GAGES

PRATT & WHITNEY

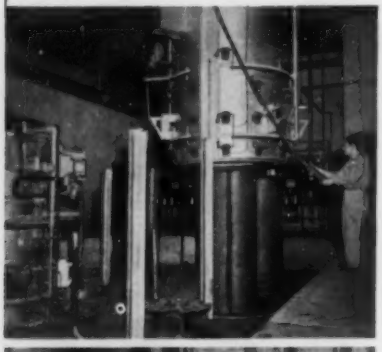
FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

Bright Annealing?
Normalizing?
Nitriding?
Spheroidizing?

You can't beat

CONTINENTAL TOP HAT



COVER-TYPE ANNEALER

Faster and More Uniform Heating Rate
Extra large volume of recirculating atmosphere.

Highest Production per Unit

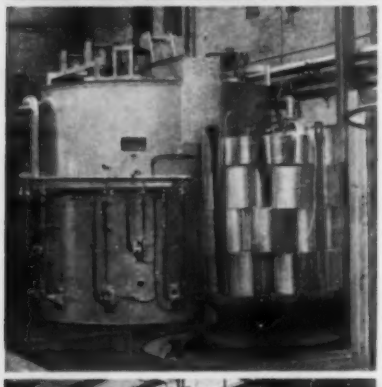
Versatility
Can be used for bright annealing, normalizing, nitriding, or spheroidizing coiled wire or strip—ferrous or nonferrous.

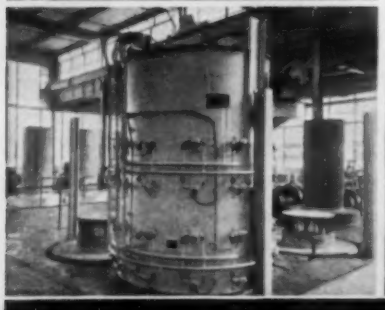
High Efficiency
No radiant tubes.

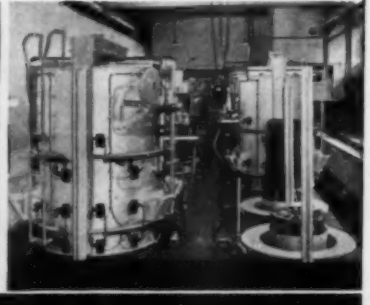
Long Hood Life
No flame impingement.

Full particulars and recommendation for any job on request.

6367







Over One-Third of a Century of Progress in
FURNACES · PRODUCTION LINES · SPECIAL MACHINES · COMPLETE PLANTS
CONTINENTAL INDUSTRIAL ENGINEERS, INC.
176 West Adams Street, Chicago 3, Illinois

N. Y. The firm's warehousing operations will be moved to Kenilworth, N. J., this spring.

Ohio Furnace Co. moved its general office and warehouse headquarters to 1003 Kinnear Rd., Columbus, O.

Arrow Tool & Reamer Co., manufacturer of end mills, special high-speed steel and carbide cutting tools, moved to 711 Stephenson Highway, Troy, Mich.

Automatic Switch Co. moved to Florham Park, N. J.

Aluminum Co. of America shifted its Milwaukee district sales office to the Bockl Bldg., 2040 W. Wisconsin Ave., that city.

Wales-Strippit Corp., maker of metalworking tools and machinery, completed its move from North Tonawanda, N. Y., to the Buffalo Arms plant in Akron, N. Y.

ASSOCIATIONS

Gordon G. Hazell has been appointed to the newly created position of technical director of the **Prefabricated Home Manufacturers' Institute,** Washington.

CONSOLIDATIONS

Reznor Mfg. Co., Mercer, Pa., bought **Arthur A. Olson & Co.,** Canfield, O., maker of stainless steel, direct fired gas and oil heaters.

Yuba Mfg. Co., San Francisco, purchased **Adsco Industries Inc.,** North Tonawanda, N. Y., maker of heating appliances. Yuba makes mining machinery, dredges, dredge pumps and similar products and fabricates steel plates and structural steel.

Townsend Co., New Brighton, Pa., acquired **G. O. Noville & Associates Inc.,** Santa Monica, Calif., a research and development organization. Townsend is a manufacturer of cold-formed parts and industrial fasteners.

IN ELECTRICWARE, TOO,

Sharonsteel Quality STANDS OUT

- There are so many advantages to stainless electricware it's no surprise that sales are skyrocketing. Homemakers like the natural beauty of stainless — the way it easily absorbs the punishment of everyday use and stays forever new with a minimum of care.
- Sharon's thorough knowledge of the utensil industry, the ability to produce specification steels of consistent uniformity, plus the finest finishes in the industry are reasons why so many of the nation's leading electricware manufacturers specify **Sharon Quality Stainless Steels.**

SHARONSTEEL

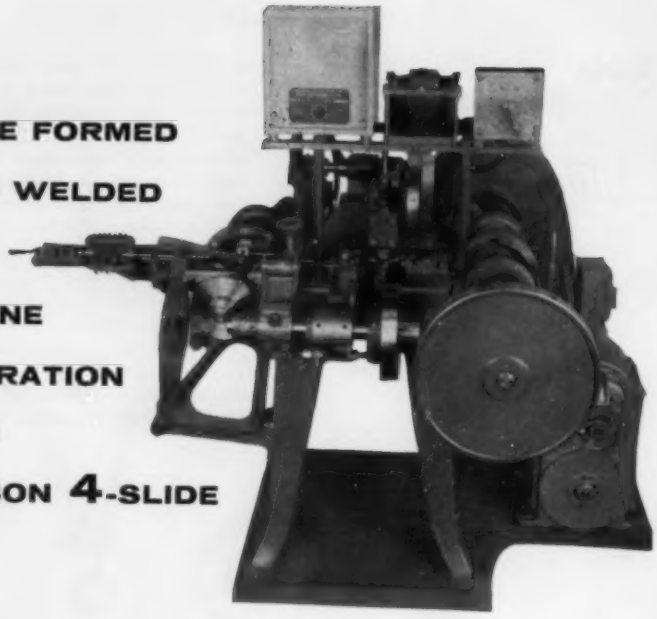
For 56 Years a Quality Name in Steel

172

SHARON STEEL CORPORATION, SHARON, PENNA.

CHICAGO, CINCINNATI, CLEVELAND, DAYTON, DETROIT, GRAND RAPIDS, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, MONTREAL, TORONTO

WIRE FORMED AND WELDED IN ONE OPERATION WITH NILSON 4-SLIDE



Garter loop formed and welded in one fast operation by Nilson 4-Slide.

Production is increased more than 25% by Hawie Manufacturing Company using a #1 Nilson 4-Slide with welding attachment which eliminates need for ferrule loops in the manufacture of hose supporters. .062 soft basic wire is formed with ends welded in one automatic operation at a conservative 105 pieces per minute. Additional savings are realized in eliminating cost of ferrule.

Another example — Drapery hook is formed with two wires entering 4-Slide simultaneously and automatically welded together at point of contact.

Nilson 4-Slides will produce many types of wire forms similar to the part shown here in which two pieces must be welded or otherwise closed together. By the mounting of automatic welding equipment on the 4-Slide, such parts can be produced in one fast, accurate operation at minimum cost. Nilson 4-Slide Wire Forming Machines are available in a wide range of sizes to handle basic steel wire from 1/32" to 1/2" diameter.

A.H. NILSON MACHINE COMPANY

1512 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

Get Set for Metalworking's Fabulous Future . . .

profit sharing . . .

motivation for efficiency

• New attention will be focused on profit sharing in 1957. Management finds it's a tool for motivating men to greater efficiency. STEEL, in its Apr. 15 issue, will analyze some of the major plans, show how they work, what they do and the benefits they offer to workers, the company and stockholders.

Profit sharing isn't a panacea—it isn't even adaptable to some companies. But more and more metalworking firms are finding it useful. Check to see if it can help you. Read the third in STEEL's 1957 Program for Management, appearing next month. Articles in the ten-part series published to date:

1. **The Care and Feeding of the Junior Executive**
(Feb. 11, p. 93)

2. **Grooming Middle Managers**
(Mar. 18, p. 93)

Extra personal copies of these Program for Management articles are available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Management Development

Grooming Middle Managers

TAKE a pencil and draw a line through the names of the two top men on your organization chart, your president and executive vice president. Suppose they had to be replaced today. Are qualified men ready to fill their shoes?

Such an exercise brings home the wisdom and urgency of grooming the middle manager—your vice president, executive vice president or president of tomorrow.

Of course, few vacancies will spring from an emergency, but the executive manpower problem is no less real:

1. An increasing number of men of management caliber is needed because the business population is on the uptrend, and the growth of companies sharing in metalworking's fabulous future will tend to compound the shortage.

2. The job of being a top executive, even in a small company, is becoming increasingly complex. Middle managers of today need all the help they can get.

Scope—No company is immune, but the problems are particularly prevalent in the small companies. They outnumber their big brothers many times (see chart on page 95), and on a comparative basis, too few are developing middle managers.

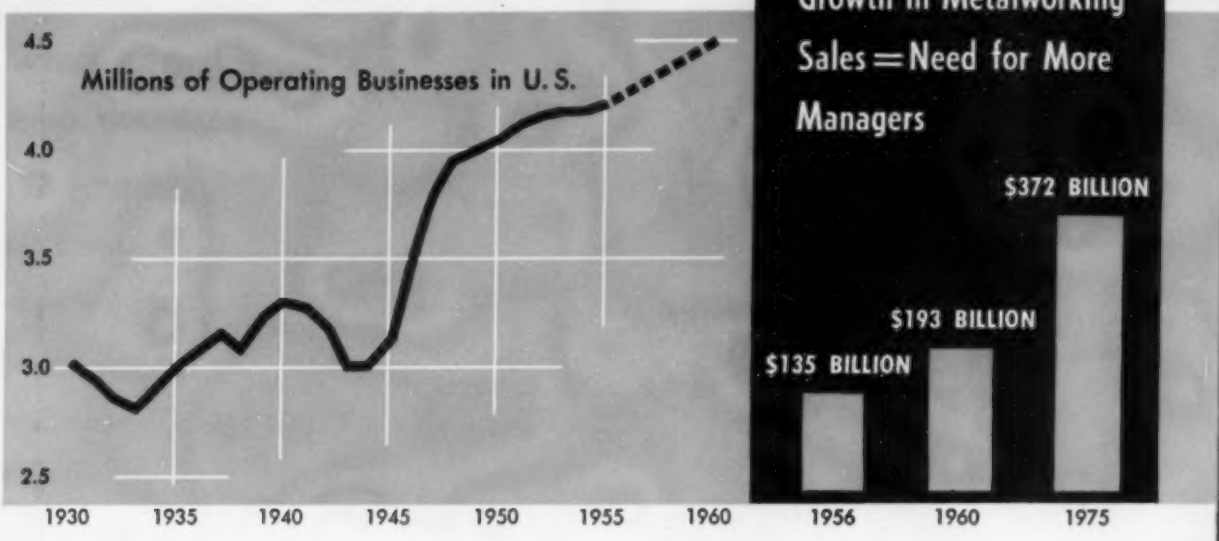
The only real difference between a big company program and a little company program is one of degree, not character. In either instance, the benefits are the same.

Companies that develop middle managers are building a reservoir of talent for key executive posts. In the process, trainees learn to do their present jobs better, which, in itself is no small matter.

Room for Improvement

Around 90 per cent of business failures (see chart on page 95) stem from inadequate management—human failures . . . in judgment,

More Businesses = Need for More Managers



personality, decision, ability and know-how.

Of course, small companies are a prime target because there are so many of them. Ninety per cent of the metalworking companies (of 20 or more employees) have fewer than 500 employees (see chart on page 95).

But size has nothing to do with a more universal problem. Many companies exert considerable effort to train men for mechanical and technical work but neglect to develop people for management responsibilities.

Martin M. Bruce of Dunlap & Associates Inc., Stamford, Conn., says in a leaflet put out by the Small Business Administration: "Detailed observation and analysis in more than 2000 organizations suggest that a great many potential executives remain unprepared for top jobs because they have been prevented from developing.

"Psychologically," Mr. Bruce points out, "they often represent a threat in the eyes of the man who is already in the driver's seat.

"The present executive, frequently because of his own insecurity and real or imagined inadequacies, keeps the aspiring manager from growing into the top job. Does he do this deliberately? Not usually. Much more often," Mr. Bruce explains, "the present manager doesn't mean to hold the potential manager down; he just doesn't really give him a chance to grow."

Case History

The Williamson Co. is a small metalworking firm with headquarters in Cincinnati. It has 750 employees in its Cincinnati and Madison, Ind., plants, who make home heating and cooling equipment.

Since 1938, Williamson has had a development program for middle managers—men above the junior executive level but below the rank of top manager.

Getting Ready—The president of the company (William L. McGrath) and executive vice president (Lawrence B. Murphy) will reach retirement age in a few years. Nothing about their succession has been left to chance.

Williamson operates under a multiple management system. It has a senior board of directors and three junior boards. Replacements for the president and executive vice president will come from the senior group, and junior board members will fill the vacancies on the senior board. Junior boards will be filled by people from the supervisory force.

Only one member of the senior board is not a full-time employee. He is a financial consultant.

Rounding the Man—Members of both boards get experience working with one another and coaching from their superiors. At some time in their careers, they attend an advanced management course at the University of Cincinnati. By the time a man is tapped for a higher management responsibility, he has had considerable exposure to company-wide problems and has been trained to deal with them. A sizable pool of trained managers is available. The company can pick and choose.

Dual Purpose—Development of management is not the only reason the Williamson Co. has multiple management. This system is also a means of managing the company.

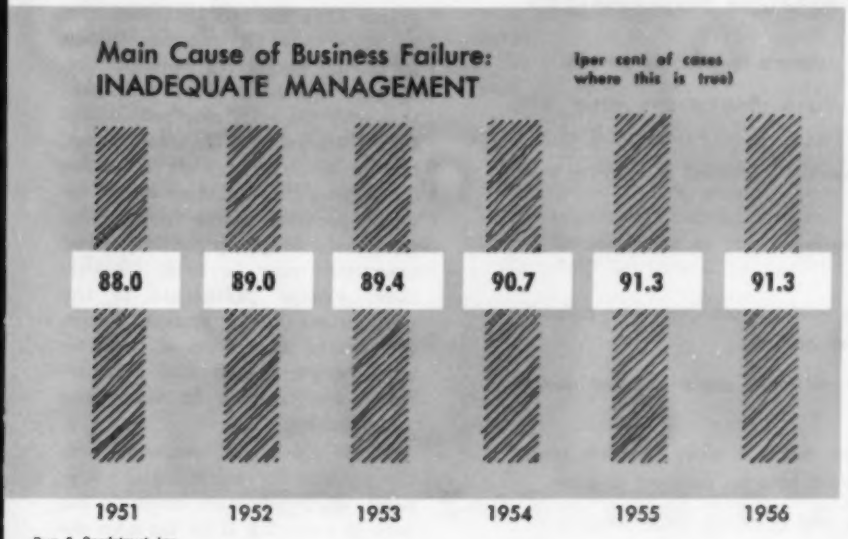
But you don't have to adopt this method. You can use your present company structure.

Simple as This

Giving men an opportunity to grow is the hard core of management development. You don't need a fancy, expensive program.

The most important thing you must do is provide a climate that will allow men to develop as far as their capabilities permit. This may or may not include training

Need for Better Managers



Dun & Bradstreet Inc.

at a university. The bulk of the training will come from day-by-day coaching on the job.

"There is no substitute for the day-by-day counseling and coaching of the subordinate by his superior," declares Harry M. Hopkins, vice president in charge of operations at the Tool Steel Gear & Pinion Co., Cincinnati.

A job shop that makes hardened steel parts for machinery, the company has had a management development program for 15 years. Mr. Hopkins, a spark plug in the operation of the program, is an authority on management development.

Impressive growth has been a by-product of this company's program. It now has 660 employees, compared with the 250 it had 15 years ago.

No Stone Unturned—In addition to day-by-day coaching on the job, the company "utilizes to the fullest the available sources for information and training, such as schools, trade and professional associations, and visits to other companies," Mr. Hopkins points out.

Looking at away-from-the-office training, Mr. Hopkins comments: "Some small companies (and large ones) say, 'Our people are too busy to spare right now.' Our attitude is that any man worth such training will always be busy, and will always be missed when he is off the job, but that nothing he could be doing now is more important than broadening his viewpoint and developing his managerial skills in preparation for the future."

A Way of Life

There is no set pattern to use. What may work well for one company may be less effective in another. Any program you set up should be merely a way of business life.

While the Williamson Co. and the Tool Steel Gear & Pinion Co. each uses a different management structure, they have one thing in common. Each favors arrangements which encourage the largest number of people to participate in making decisions. This is the way they learn. Mr. Hopkins is firmly of the opinion that it is literally impossible to teach anyone anything. "All we can do," he declares, "is to give people opportunities to learn."

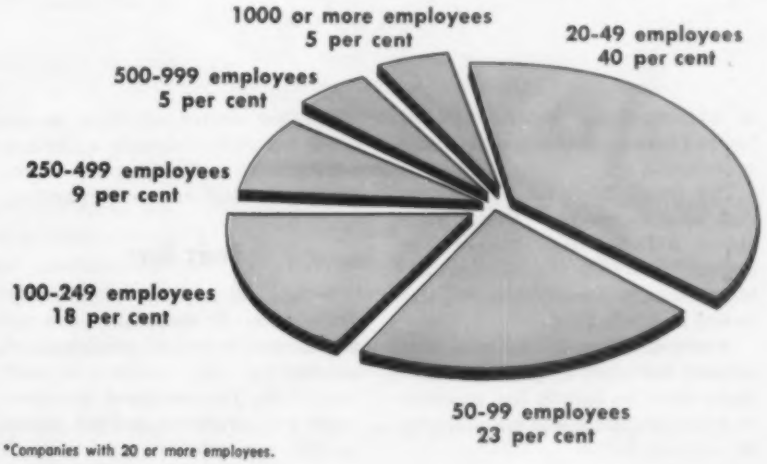
How To

How do you go about setting up a program? There are two ways: 1. You can do it yourself. 2. Or employ a consultant. (For a pattern of "how to do it," see page 97.)

It also would be a good idea to contact the nearest office of the U.S. Department of Commerce for helpful booklets issued by the Small Business Administration. For 25 cents you can get its 44-page booklet, "Executive Development in Small Business." (It's also available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.) This booklet tells how to help executives develop and lists sources

Small Companies: The Biggest Field for Strengthening Managers

(90 per cent of the metalworking companies* have less than 500 employees)



*Companies with 20 or more employees.

What Makes a Good Manager

1. He understands the value of example to influence people.
2. Knows that systematic and logical thinking gets easier with practice.
3. Respects orderliness as an essential ingredient in effective business management.
4. Recognizes time as a management tool, to be conserved for "first things first."
5. Realizes that responsibilities without commensurate authority usually cannot be discharged properly.
6. Appreciates that constructive criticism is one of the best devices for development.
7. Is aware that loss of temper tends to close people's minds, breeds resentment and does not help an assistant to grow.
8. Willingly seeks help, advice and guidance when needed.
9. Will give up an unwise position rather than let it ruin a whole program.
10. Will resist being forced into snap decisions based on inadequate or unreliable information.
11. Confidently can decide what to do and act promptly and aggressively, once he has analyzed and evaluated available facts.
12. Is ready to undertake and carry through distasteful, boring and inconvenient assignments which fall in some measure to every executive.
13. Patiently learns to do well as a second in command before seeking the job of chief executive.
14. Can see the future possibilities in a product, a man and a business.

Martin M. Bruce, Dunlap & Associates Inc., Stamford, Conn., writing in No. 8 of the Small Marketers Aids issued by the Small Business Administration.

of additional assistance, such as books, professional associations and consultants.

The Small Business Administration also issues the "Small Marketers Aids," free of charge. Example: "Providing Management Replacements in Small Business" was issued in April, 1956.

Warning—If you engage a consultant, don't buy a "package deal." Make sure he tailors the program to your specific needs and abilities to conduct it.

Another source of "how to do it" is companies already operating management development programs. A visit can be rewarding.

Start Here

Setting up a program is a top-drawer job. It must have the approval and constant wholehearted support of the company's chief executives. The president, the executive vice president and all others in the top echelon must give it more than lip service. Otherwise, it is doomed.

Companies with successful programs have learned that they can be sure they fit company needs by having executives work out the specific details in close collaboration with the staff men responsible for development. In some cases, this is done through an executive development committee which includes representatives from all departments, or group conferences of executives may be held. Usually, these groups participate in the preparation of appraisal forms, recommend what form of performance review to use and help arrange for training in counseling and coaching.

While the chief executive sets the pattern for executive development, each executive must do his part in tailoring it to his own department. Many companies find it a good idea to include responsibility for developing subordinates as a standard item in job specifications for management positions.

With Open Arms

The introduction of a program will be welcomed by the middle managers. They'll recognize it as an opportunity to get ahead. A survey of 422 executives who left their jobs voluntarily showed 85 per cent did so for two main reasons: 1. They wanted bigger jobs and more responsibility. 2. They wanted greater opportunity for growth.

After a man reaches a middle management post, he is probably satisfied with the money he is getting. What he aspires to now is a sense of achievement, creative activity and approval of his group. A development program helps satisfy these wants.

Tip—In the grooming process, middle managers are going to be entrusted with responsibilities that otherwise might not come their way. They will make mistakes, but, remember, they learn by doing.

Side Benefits

An advantage of such a program is that it gives the boss some help with his work. At the same time, he must realize trainees must

be freed from some of their routine duties.

Another advantage of a program is that it prevents ability from being wasted through "burial." Occasionally, a man with considerable management talent will be stymied in a lower echelon.

Five Ways—He might be buried by seniority. He never gets a chance to show what he can do in a managerial capacity because his immediate superior is long-lived.

He might be buried by geography. He is in a branch office, and doesn't come into frequent contact with the home office and top managers.

He might be buried by submergence. He is held down by a domineering superior.

He might be buried by specialization. He is in a highly specialized type of work where there is no supervisory or administrative responsibility.

He might be buried by department. He is in a department which apparently does not contain managerial talent.

Example—Take the case of the Wisconsin Electric Power Co., Milwaukee. It was seeking a highly able man who could grow up with a new power plant and be the engineer in charge for a number of years. The time and age factor disqualified most of the top supervisors in the company's other stations, so an appraisal of the entire power plant supervisory

How To Set Up and Run a Program

1. **Top management must recognize the need and have a genuine desire to institute a program.**

2. **President or chief executive officer sets up a committee of three or four top managers to study the company's needs, to formulate and institute a program. This committee could also help operate it.**
   a. Keep all employees informed of progress being made in setting up program. Be sure to "sell" employees on how they will benefit even though they may not participate.
   b. Determine whether your framework of management is right and adequate. How many top management men do you need below the level of president? A chart may help you visualize your needs. You may need the aid of an outside adviser to determine your framework. Proper structure is frequently built around capabilities of individuals.
   c. Draw up a list of responsibilities of each top management position.
   d. Draw up a list of abilities and qualities a man should have for each of the top management jobs.
   e. Use check list (see pages 98 and 99) to help you select men who show greatest promise of development. (A good candidate may not be in a middle management job. He may have become buried in a lower echelon.) Maybe you'll also want the guidance of a psychologist.

3. **Show selectees where they need further development.**

4. **Provide the training. There are two places to do it:**

   On the job:
   a. Day-by-day coaching of the man in his present job. (This aids the man's self-development, one of the best means of executive development. A man learns by doing.)
   b. Listening in on important conferences and meetings. (This helps keep men informed about company-wide problems and aims.)
   c. Provide an informal library that will help the trainee.
   d. Group meetings for exchange of ideas.
   e. Use motion pictures or slides as training aids.
   f. Bring in speakers who have ideas and information helpful to trainees.

   Off the job:
   a. Send trainee to advanced management courses at universities, and workshops, seminars and clinics sponsored by business associations and management consultants.
   b. Encourage attendance at association meetings and conventions.
   c. Provide visits to other companies so trainee can see how they operate.

5. **Make periodic appraisals of how the program is running and how each individual is doing.**
   a. Use rating sheets to measure the individuals.

group was undertaken, beginning at the upper levels and working downward. Standards were high, and results were increasingly disappointing as the bottom of the ladder was approached.

But the search was rewarding! The man who could fill the bill was found in the boiler room of a 50-year-old plant. The boiler room not only is at the bottom of the plant, but its supervisors are at the bottom of the supervisory ladder. This man was on the fifth rung. He was transferred immediately to the modern Port Washington, Wis., power plant to serve as second assistant. A few months later, he was transferred to the company's Oak Creek plant. When the first unit went on line in September, 1953, he was the engineer in charge.

Ready, Willing, Able

When you are positively and consciously aiding management development, you will be able to realistically appraise the abilities of your people. You will be looking for every nugget.

But do not select an heir-apparent for a job. The best qualified man should get it. Otherwise, any management training program breaks down.

Opportunities for self-improvement and advancement must be based upon merit and made open to every employee who shows:

1. Excellence in performance on his present job.
2. Evidence of potential for growth.
3. Willingness to pay the price in personal effort and dedication.

Building Your Own

Bringing in men from the outside to fill openings in the top echelon isn't cheaper than a training program or a substitute for one, say Mr. Murphy of the Williamson Co. and Mr. Hopkins of the Tool Steel Gear & Pinion Co.

Neither company has taken in an outsider to fill top jobs since the start of management development programs. Mr. Murphy feels his company has lost nothing by shunning such replacements. He believes that any danger of inbreeding is more than offset by having men who have grown up with the company. They know more about it, and you know more about them, he contends.

Consensus—There is a general feeling that a policy of promotion from within is mandatory if vacancies are to provide an incentive.

If your program works, you shouldn't have to go outside your company to fill top positions. There is no shortage of potential managers, declares F. L. Larkin, vice president of the Wisconsin Electric Power Co., a company that has followed a systematic plan of executive selection for ten years.

How To

Ability

YES	NO	
☐	☐	1. Does he know his job?
☐	☐	2. Can he make decisions?
☐	☐	3. Are his intellectual resources adequate?
☐	☐	4. Has his division or department forged ahead of competition since he was placed in charge?
☐	☐	5. Are his reports concise, accurate, and well organized?
☐	☐	6. Can he distinguish the relative importance of different tasks?
☐	☐	7. When quick decisions must be made, does he generally make the correct ones?
☐	☐	8. Is he tactful?
☐	☐	9. Does he anticipate needs, foresee and meet changing conditions?
☐	☐	10. Does he reserve adequate time for policy matters?
☐	☐	11. Is he a widely read and well informed individual? Does he retain facts and ideas?
☐	☐	12. Is he able to interpret financial statistics and business indices, understand accounting processes?
☐	☐	13. Does he delegate enough authority and responsibility?
☐	☐	14. Has he obtained loyal and capable assistants?
☐	☐	15. Can he judge accurately the capacities of those who work for him?
☐	☐	16. Does he keep his subordinates well informed concerning objectives, progress, and organizational changes?
☐	☐	17. Does he encourage participation by subordinates in solving problems?
☐	☐	18. Does he make adequate use of the services of specialists?

What you must have is a means of recognizing these people and training them, Mr. Larkin says.

Take Inventory—At the start of a program, you will want to carefully size up your people. You might look for such traits as the ability to view problems with broad perspective, the willingness to detach one's self from the types of close personal relationships which tend to make objectivity difficult, and the capacity to withstand frustrations.

Also, you'll want to consider what goals your possible future managers will wish to achieve. Their job objectives and your company's needs must harmonize.

Yardsticks

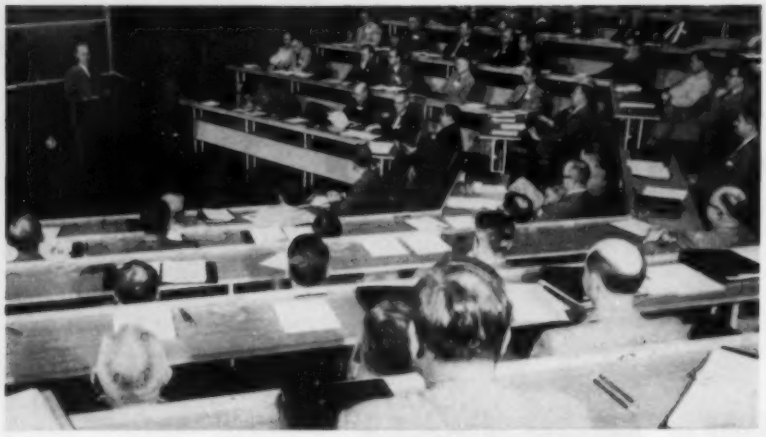
You'll want to use appraisal or rating sheets to measure your men. (One such check list is on pages 98 and 99.) They are used at the start of your program and

Rate Your Middle Managers

YES	NO	*Integrity*
☐	☐	1. Does he contribute independent thinking to discussions?
☐	☐	2. Has he respect for the leadership of his superiors?
☐	☐	3. Does he show confidence in his subordinates?
☐	☐	4. Can he give praise wholeheartedly when warranted?
☐	☐	5. Are his personal standards of accomplishment high?
☐	☐	6. Has he made himself an integral part of the organization?
☐	☐	7. Do his plans for the future include the company?
☐	☐	8. Is he respected and trusted in his community?
☐	☐	9. Does he devote adequate time to civic activities?
☐	☐	10. Has he a good credit record?
☐	☐	11. Does he permit constructive criticism by his friends and business associates?
☐	☐	12. Is he tolerant of persons of other religions, races, or customs?
☐	☐	13. Is he tolerant of opinions which oppose his own?
☐	☐	14. Can he admit mistakes readily?
☐	☐	15. Does he control his emotions?
☐	☐	16. Does he give credit when and to whom it is due?
☐	☐	17. Has he advanced subordinates without regard for friendship or family relationship?
☐	☐	18. Does he work as hard when not supervised or observed?

YES	NO	*Industry*
☐	☐	1. Is his work thorough, showing study of all possibilities?
☐	☐	2. Does he work steadily without growing discouraged?
☐	☐	3. Is he a "self-starter"?
☐	☐	4. Does he bring a specific job to completion? On schedule?
☐	☐	5. Is he observant?
☐	☐	6. Has he continued to study and learn in his present position?
☐	☐	7. Does he take an interest in company functions—sales, production, finance—not his immediate responsibility?
☐	☐	8. Has he educated himself for the position above his own?
☐	☐	9. Has he added to his responsibilities in his present position?
☐	☐	10. Has he developed a replacement for his own position?
☐	☐	11. Does he keep himself physically fit?
☐	☐	12. Does he maintain contacts with his field through trade publications and associations?
☐	☐	13. Does he have long range work goals?
☐	☐	14. Is he generally prepared with facts or figures to substantiate his ideas?
☐	☐	15. Does he avoid unnecessary work on comparatively unimportant details?
☐	☐	16. Is he willing to adopt new processes once they have proved effective?
☐	☐	17. Does he have a firm desire to succeed?
☐	☐	18. Does he approach new tasks with enthusiasm?

American Institute of Management



GE Develops People

GENERAL ELECTRIC CO. spends between $35 million and $40 million yearly on over-all training and educational activities.

But don't let that scare you. If you (like GE) recognize the urgency and importance of manpower development, the comparative cost or size of your program is immateriol. The training of employees at all levels is the important thing, says GE.

In the photo above, Ralph J. Cordiner, president of GE, is talking to a class at the company's Management Research & Development Institute. The first school of its kind in the nation, it is attended by such senior executives as vice presidents and general managers. Advanced concepts of professional management are studied.

The institute is only one example of the company's over-all manpower development program. In an average year, one out of every eight GE people at all levels takes company-conducted courses.

GE conducts many courses in factory skills and at least 500 for professional, technical and semitechnical personnel at its various plant locations.

One of the chief ways GE helps the talented person make his career with the company is by constantly trying to enlarge the opportunities by which he can develop to his full usefulness.

In 1956, the company conducted over 1000 courses in factory skills either to orient people to new work opportunities or to prepare them for better jobs. Some 200 employees took courses to equip them to be foremen, and 1982 high school graduates participated in apprentice programs.

During the year, a record 1800 young people joined GE immediately upon graduation from colleges. More than 85 per cent enrolled in one of ten programs designed to fit them for responsibilities in major functional areas, including apparatus sales, atomic development and metallurgy. More experienced employees took part in such activities as the company's advanced marketing management seminar.

Over 6500 employees were enrolled in professional business management classes at plant locations last year. The institute tops this aspect of the company's manpower development program. With one notable exception, nothing about this carefully planned facility came about by accident.

At one time, it had the dubious distinction of having the same postal address as Sing Sing prison (Ossining, N. Y.). Some embarrassment resulted. Executives selected for the school didn't miss the opportunity to tell associates that they were "being sent up the river."

The adopted address is Crotonville, N. Y.

at regular intervals thereafter to see what progress is being made. Have your employees rate each other. You may be impressed by what you can learn from this technique. Employees often are in a position to know the strengths and weaknesses of their associates.

The Williamson Co. uses this technique. Members of its junior board rate each other on these qualities: Intellect, vision, ambition, vocality and personality. Its senior board goes further. Members rate one another on: Intellect, vision, judgment, initiative, ambition, co-operativeness, decision, open mind, vocality and poise.

Pave the Way

When a top management position becomes open, take care in how you fill it. Choose the best qualified man. If there are several people whose qualifications make them close contenders, talk with each before the appointee is notified. Let each know who is to receive the appointment and why. They will accept it better if they know of the coming appointment and why they were not chosen.

Expense

It's almost impossible to predict how much a program will cost. Some of the things you'll do in a program will be things you'd do anyway—only you'll do them better.

This much is certain. Your investment in management development will pay handsome dividends if you honestly try to make your program work.

Keep These in Mind

As you set about to groom your middle managers for higher responsibilities, bear in mind these points about your program:

1. Keep it simple.
2. Tailor it to fit your needs.
3. Make it continuous. (It's easy to set up a program, do something enthusiastically for a short while, then forget it. This is a waste of time. You must follow through.)
4. Be patient. It takes time to get results.

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Technical Outlook

HIGH STRENGTH STEEL—The strength level of 4340 steel heat treated to 260,000 to 280,000 psi depends on tempering temperature. To compensate for variations in hardenability of different lots, metallurgists at Lockheed Aircraft Co., Burbank, Calif., measure the hardness of parts after quenching, then regulate tempering temperature accordingly. These figures were given by Lockheed's W. V. Ward at a recent ASM meeting in Cleveland: If hardness is Rc 53-54, temper at 400°F; for Rc 55-56, use 450°F; for Rc 57 or more, use 500°F. Temperature is controlled within 10°F, and treatment time is 8 hours.

MORE HIGH STRENGTH NOTES—Mr. Ward also reported that aircraft builders are becoming more conscious of transverse properties. He expects a new specification on this property in aircraft steels to be issued soon. Corrosion protection for parts in the 260,000 to 280,000 psi range is also a problem. Lockheed used cadmium plating followed by a 350 to 375°F bake. Vacuum deposition of cadmium on bolts is used to avoid all traces of embrittlement. He also reported that work on a nonembrittling cadmium plating bath looks promising.

PACKAGE REACTOR PROGRAM— A 15-ton steel cylinder which will contain the nuclear fuel (enriched uranium) in the Army package power reactor was set into place recently. Some of its specs: It's 4 ft in diameter, 8 ft long, is made of carbon steel with stainless cladding on the inside, and has ellipsoidal heads at each end. All joints are welded, radiographed and stress relieved to withstand high pressures of the water coolant. The plant is a prototype of a 2000-kilowatt reactor being developed for use at remote bases. All components will be transportable by air. In operation, high pressure water circulates through the reactor core to remove heat generated by nuclear fission. This is converted into steam to run a turbine-generator. Alco Products Inc., Schenectady, N. Y., is building the plant under an AEC contract.

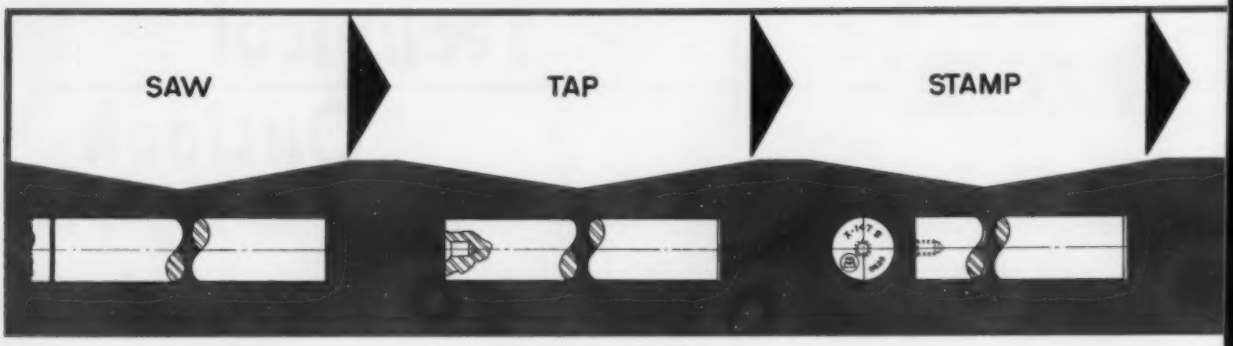
CLEANABLE— Checkers for the new 275-ton open hearth furnace at Detroit Steel Corp.'s Portsmouth, O., plant are designed for easy maintenance. Charging floor posts extend to the lower pad level throughout the shop, giving substantial access to both sides of the two-pass regenerators. Lancing is possible to full depth of the settings in both passes.

TITANIUM BELLOWS— They weigh 44 per cent less than their stainless steel counterparts used in aircraft ductwork. Titeflex Inc., Springfield. Mass., is making them from Rem-Cru alloys A-70 and A-110AT. Because the sections are so thin, engineers had to develop a new welding technique to make the bellows.

GETTING BIGGER—At the IRE show (New York, Mar. 18-21), Branson Ultrasonic Corp., Stamford, Conn., will exhibit an ultrasonic cleaning tank which is 10 ft long. The company says it's designed for use in conveyorized systems and for cleaning long items, such as pipe.

PH TUBES— Made of 17-7 PH (precipitation hardening) stainless, they are available from Carpenter Steel Co.'s Alloy Tube Division, Union, N. J. The hardenable Cr-Ni steel is recommended for parts requiring abrasion resistance, high tensile strength and a springy temper. Its high strength-weight ratio makes it outstanding for use in aircraft and guided missiles.

Metalworking Outlook—p. 47 *Market Outlook—p. 173*



Here is the sequence of operations for the semifinish machining of steel piston rods for pumps. All cycles and transfers will be automatic

JOB SHOP OF TOMORROW?

Automation Is Tailored for Short Runs

Punched cards will control six machines to produce 600 types and sizes of pump rods. All machines will be guided from a central console. Line is to be completed this year

EVER SINCE the '40s, job shop operators have been prospects for automation. Few have signed on the dotted line.

Biggest reasons: Job shop work is based on short lots. Equipment must be versatile; changeover time from one job to another must be short and the cost low.

So far, this combination of factors has kept most automation out. Although it's admirably suited for economical production of long runs, automation often has lacked the kind of versatility job shoppers need.

Switch—The future may tell a different story. For one thing, numerical controls represent a form of automation that's keyed to the short runs. (STEEL, Jan. 21, p. 100.)

Evidence that these controls are ready for small plants is on the books. Engineers at Mission Mfg. Co., Houston, are installing a line of six semistandard machine tools. All will be controlled by punched cards from a single, central control console.

The Job—The line will machine steel piston rods for Mission's oil field mud pumps. Although all rods are similar, there are about 600 different types and sizes. Each goes through the sequence shown in the illustration above.

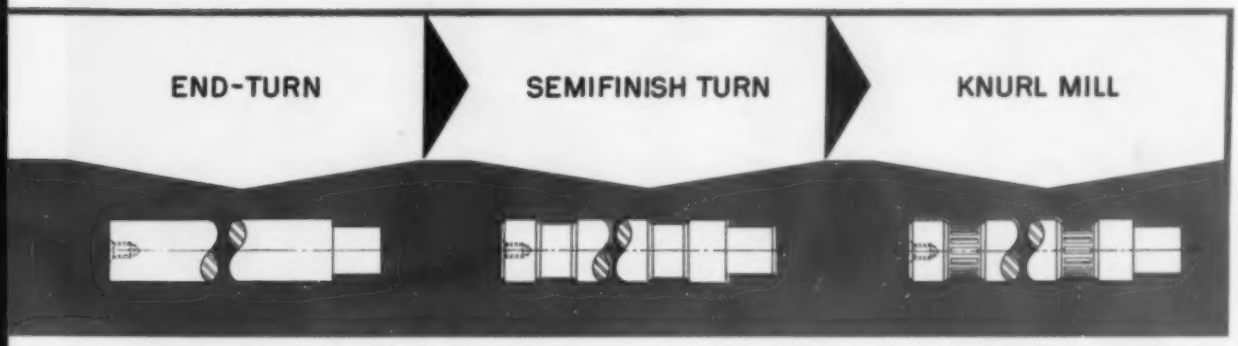
The line will be called on to turn out several thousand rods a month, but most orders will be for less than 100 identical parts. The average is 20 or 30 parts, but Mission's executives say they also get many for one or two pieces.

Two Stages—By the end of 1957, the line of machines will be in automatic operation. Business machine punched cards, programmed for the quantity and dimensions needed, will be fed into the Mission-built card reader of the master console. The console will control machine setup and cycles for all six machines.

The line will go into operation in stages. The knurl mill now is operating on numerical control. The end-turning machine (a rebuilt Warner & Swasey 3-A) is being installed. The semifinish turning machine is to be delivered about Apr. 1. This machine, a Monarch model 20 Monamatic, will go into operation with a Mission-built tracer at first. It will be converted for numerical control later. The sawing, tapping and stamping units (already designed) will be built and installed late this year. Mission will build both the tapping and stamping machines; the saw will be a modified Ohler cold saw.

Sequence—At the entry end of the line, signal lights tell the machine attendant the required bar stock diameter to feed into the saw. If he tries the wrong diameter, or if the bar length is insufficient, the saw will refuse the stock. From this point on, the sequence is automatic.

The saw feed adjusts to proper length, and the part is cut off. Pushers raise it to a gravity feed rack which drops the part into the drilling and tapping unit. This unit chooses one of two tap sizes (½-13 or 5/16-18) and drills and taps the correct hole.



Selector—Another gravity rack drops the part into the stamping machine in which as many as 12 characters are stamped on the end of the shaft. The characters are put on radially around the tapped hole.

Selection of characters, which is entirely automatic, is controlled by the punched card. Any letters of the alphabet, any of the ten digits, punctuation marks and a few symbols such as the Mission monogram and the API symbol can be used.

Turning—The part is lifted to a wait rack where it is picked up by an overhead transfer mechanism which puts it in the modified turret lathe. This transfer is a box frame, equipped with two lift arms and grab claws. One arm lifts the part off the wait rack and inserts it in the turrent lathe. The other simultaneously removes the finished part from the lathe

Will It Pay Off?

After extensive studies on their proposed numerically controlled line, Mission executives are convinced it will give them these benefits:

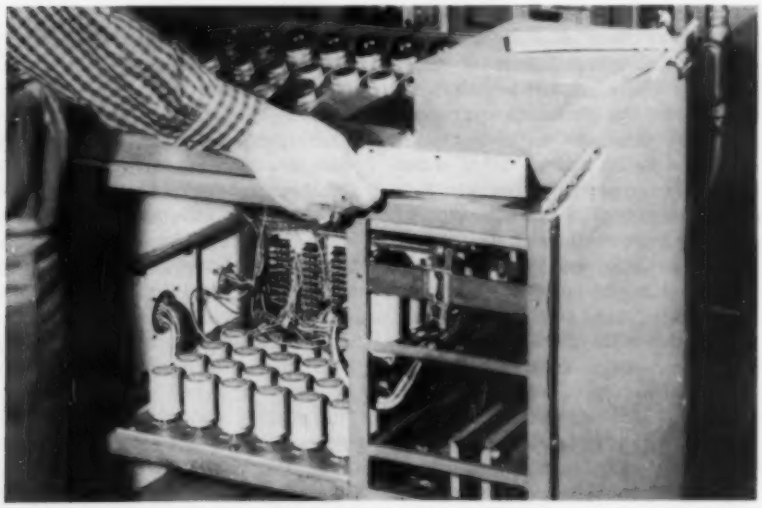
REDUCED SETUP TIME. Engineers figure to cut 90 per cent off setup time in the production of pump piston rods.

FASTER PRODUCTION. Faster cycles probably will boost production capacity 50 per cent.

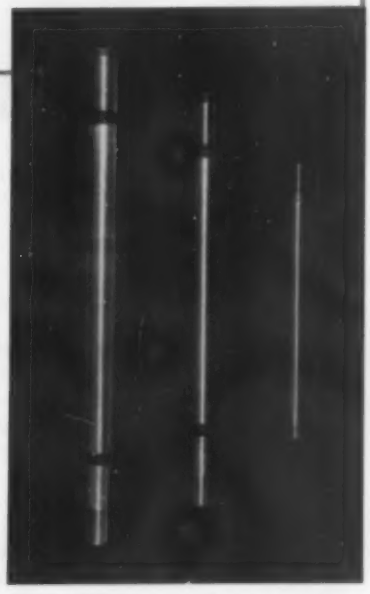
DIRECT LABOR REDUCTION. It looks as if about 65 per cent of the direct labor now tied up in this work can be freed to other jobs.

INVENTORY SIMPLIFICATION. Shorter process time means smaller amounts of material in process.

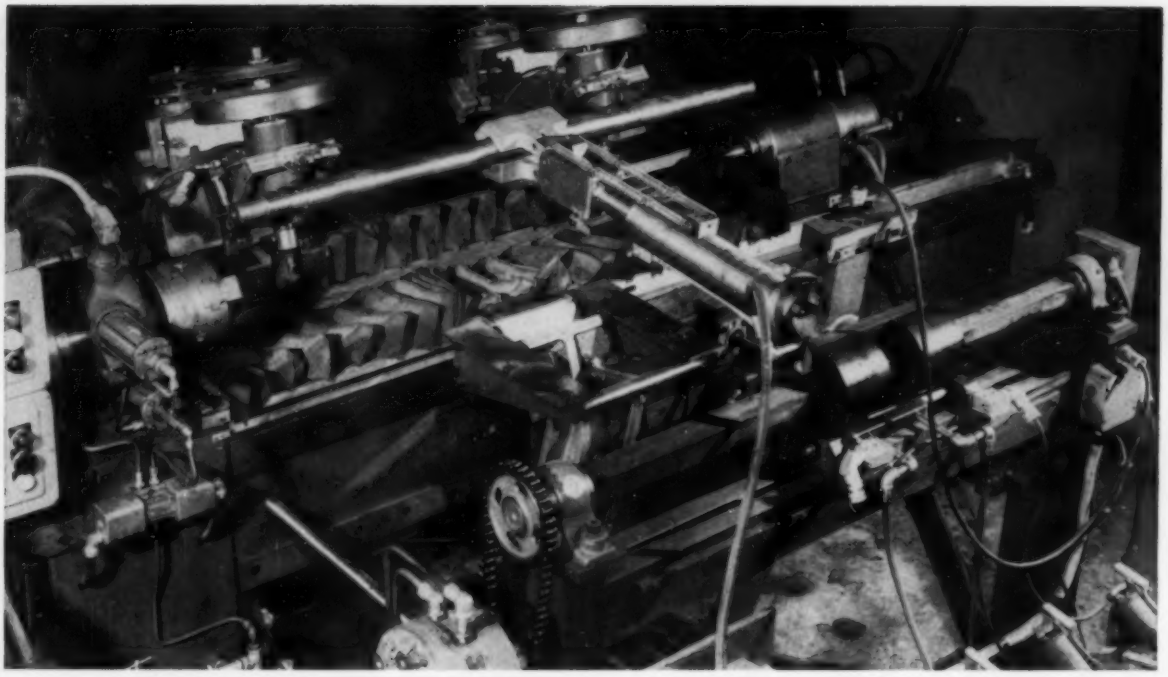
LESS SPOILAGE. Automatic operation should decrease the number of rejects.



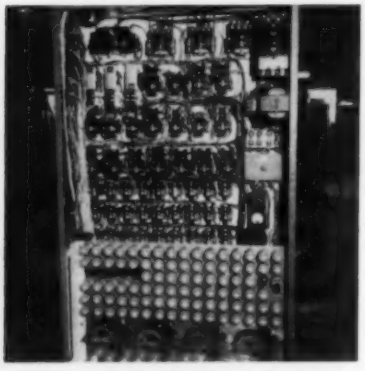
An operator puts a card in the control cabinet of the knurl milling machine. When the line is complete, all machines will be controlled from a central console



These three pump rods are typical of the 600 different types and sizes to be made on the automatic line



This knurl (spline) milling machine already is in operation. The transfer arm is loading a rod into position for milling



Close-up of the knurl machine control cabinet shows electric circuitry necessary for the numerically controlled cycles

Premier . . .

Visitors at next week's national meeting of the American Society of Tool Engineers will have the first opportunity to see portions of this line and to discuss it with production and engineering personnel of Mission Mfg. Co., Houston. A tour of the Mission plant is scheduled.

and puts it in the body turning lathe.

The turrent lathe turns a short chucking length (about 2½-in.), while the body turning lathe turns the rest of the rod, including the end chamfer and the knurl undercuts.

All data concerning such elements as length, position and diameter will be fed to the turning lathe by the master console. In an interim stage, each machine will have a card reader. A cascaded diode-and-resistor bridged circuit will be used in the temporary operation.

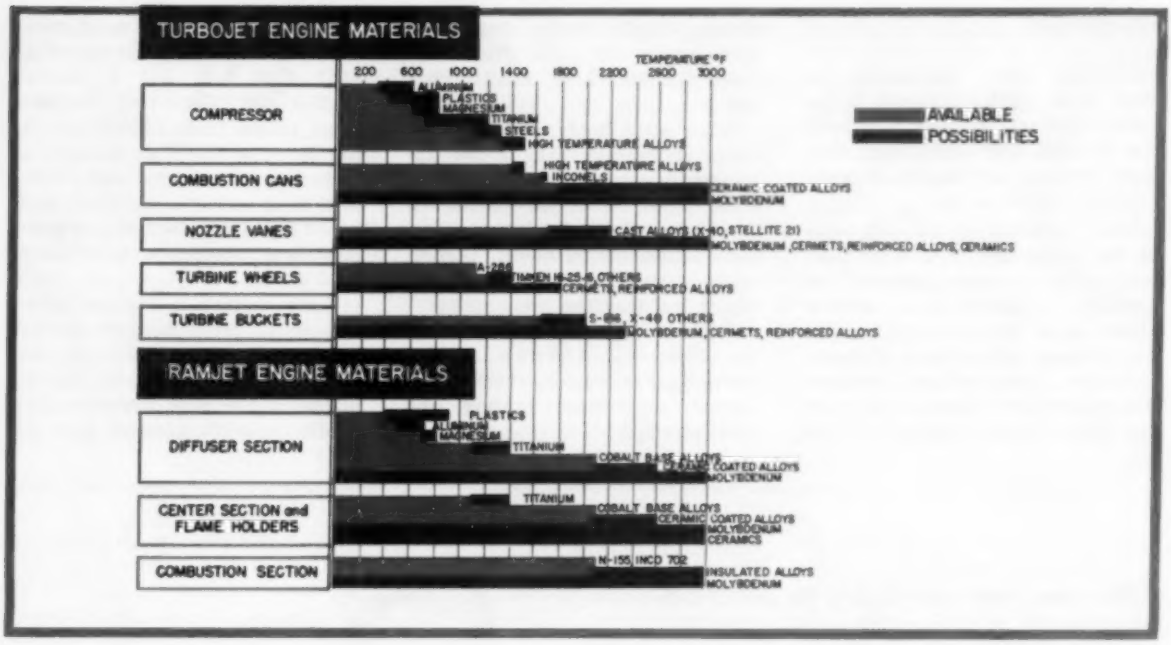
After the part is turned, it moves to the knurl milling machine (more accurately a spline cutter) where the wrench slots are milled in the undercut diameters. This machine is self-unloading—puts parts on a wait table where they're held for further operations.

Mission engineers hope the line will require only one or two attendants who can load the saw, insert punched cards in the console and change cutting tools.

Control—The final control method hasn't been determined. Several methods are being studied, including a slide-wire that has an electrical null (phase-change) point. The null point can be established by data from the card. Contacts, rigidly attached to the carriage and cross slide, will feed back electrical positions to a pair of opposed thyratrons that drive the carriage and slide.

Another system under consideration is a modification of the coaxial bifilar coil setup recently described by Canadian Westinghouse.

Holding—In the turret lathe, the hexagon turret is used as a pusher to feed a part through the chuck until only about 3 in. is left overhanging the jaws. The forward end of the rod, deep in the spindle, is held in a cone-shaped face of a free floating piston. The piston is held in a pneumatic tube. Air pressure against the piston supports the end of the bar during cutting and also ejects the part when the chuck jaws are opened and the tail turret retracts. A Square D proximity switch positions the chuck for automatic stabbing by the power torque wrench.



Wanted: Mach Metals for Jet Engines

Improvements in aircraft power plants depend on the development of heat resistant materials that will operate above today's limits of 1650 to 1700°F. Heres' a futuristic report

THE CHARTS ABOVE show the present and future of materials for engines of supersonic aircraft.

They were presented at the annual meeting of the Institute of Aeronautical Sciences in New York by Lt. Col. Rodney A. Jones, Headquarters, Air Research & Development Command, Baltimore. The following deals with what this expert had to say about engine materials for turbojets, ramjets and rockets, and nuclear power plants.

As in airframes (STEEL, Mar. 11, p. 154), the chief problem is one of strength at high temperatures.

TURBOJET ENGINES

In the typical engine of today, compression ratios of 10 or 12 to 1 are used, and compressor discharge temperature is generally below 700°F. A kerosene type fuel is burned in the combustion cans with air so that turbine inlet temperatures are about 1600°F.

But it is the supersonic turbojet engine of the future which determines many of the materials research and development problems of today.

Compressor Section — Excellent fatigue strength is a prerequisite for compressor blades. Fatigue, creep and yield strength are prime considerations for rotor discs. Materials used in current engines are aluminum alloys, where temperatures are below 300°F, and ferritic steels in the hotter areas.

Titanium alloys are being used for some compressor blades and rotors and magnesium alloys for compressor casings.

But the supersonic engine poses a different problem: The compressor inlet temperatures will be several hundred degrees higher, and the discharge temperature will approach present turbine operating temperatures.

Solutions—If necessary, various heat resistant alloys can be used for compressor components, but with severe weight penalties. Because of their lightness and excellent fatigue life, reinforced plastics have a potential up to 500°F, even higher. Up to now, they have been used only experimentally by engine designers. Erosion, low stiffness modulus and lack of experience are problems.

Titanium offers possibilities up to about 900°F, alloy steels to about 1100°F. Titanium requires much more development and testing but promises lightness. If the problems of creep and oxygen pickup above red heat can be solved, it will become important for applications in this area.

Combustion Chambers — Necessary properties of these materials are high temperature strength, oxidation resistance,

JET METALS . . .

weldability and formability in sheet form, and resistance to localized thermal stresses. The various Inconels are widely used. Ceramic coatings are applied in some cases for improved life.

Heat resistant steels and some of the nickel base alloys, particularly with ceramic coatings, can probably be improved for 2000°F operation. Above this, only coated molybdenum offers much promise.

Nozzle Vanes—Prime requirements here are resistance to thermal shock, impact, erosion and oxidation. Most nozzle diaphragm guide vanes are made from cast X-40, Stellite 21 or similar materials.

While some improvement is possible, it appears that major increases in operation temperatures must come from such materials as protected molybdenum, cermets or reinforced alloys. Ceramics may come into the picture if better compositions are developed.

Turbine — Buckets are limited by creep and stress rupture strength. For wheels, the limiting factors are stress rupture and yield strength.

Practice is to use a solid wheel of A-286 alloy or composite of an SAE 4340 hub and a Timken 16-25-6 rim. Operating temperatures range from 1200°F at the rim down to 500°F at the hub.

Buckets of cast material similar to X-40 or wrought materials similar to S-816 are used at maximum operating temperatures of about 1650°F.

Some improvements in alloys will result from further development and vacuum melting, but they will be limited by melting points of the base materials. Molybdenum holds promise here. Its

"The designer can apply to good advantage almost any advance in high temperature strength above the level we are using . . ."

By
R. B. JOHNSON JR.
Manager, Materials Laboratory
General Electric Co.
Evendale, O.

Aircraft Gas Turbines Ten Years From Now

Materials required will range from those good at liquid gas temperatures in the vicinity of −430° F to the maximum temperatures of combustion in excess of 4000°F. High speeds will result in ram inlet temperatures of over 1000°F. Over-all, the engine will be hotter. Insulators and bearing materials will be required. Designers will push use temperatures of available materials as high as possible, then use cooling if necessary.

The advent of other types of energy may increase the upper limit of temperature and create new problems due to effects such as radiation.

Coatings—In the decade ahead, ceramic coatings will receive widespread use. These insulating materials will be required on all surfaces exposed to the high temperatures of combustion. Problems to be overcome are thermal expansion and brittleness. Improved mechanical design allowing for these deficiencies will be required.

Before refractory alloys of molybdenum, tantalum, columbium and tungsten are useful, oxidation barrier coatings must be developed. This will require improvements in diffusion, cladding, plating, metal spraying and ceramic application.

New type structures, such as fabricated lightweight material, fiber material and laminations,

drawbacks: High specific gravity and need for oxidation protection.

RAMJET ENGINES

While turbojet engines rank high in importance, they are not the only power plants being considered. The ramjet offers intriguing possibilities.

While its problems and requirements are similar to those of nonrotating portions of turbojets, the one important difference is that its needs have been based primarily on fairly short operation time and limited re-use. But it's expected that the operating range will be increased from 50 to 100 hours in the future.

Despite considerable development, ramjets are still not mass produced items.

Because of this the choice of materials is subject to wide variations from design to design.

The metal combustion chambers of present day ramjets are being used to the maximum possible temperatures and are a limiting factor in design. The development of insulating ceramic coatings and molybdenum alloys offers a material to withstand the 3000°F material temperatures of supersonic ramjets. The ceramics and cermets with good oxidation resistance are in the picture as flame holder materials.

ROCKET ENGINES

The material problems of rocket nozzles, combustion chambers and auxiliary power turbines depend on a number of factors, such as: 1. The type of fuel and oxidizer and whether the fuel is liquid or solid. 2. The design. 3. The duration and severity of operation.

Even so, the basic problems stem from high pressures and temperatures, corrosive atmospheres and

---

will require developments in brazing and inspection techniques. Improved surface finishes and the lessening of surface residual stresses will be required. High pressure techniques for sintering and laminating materials will become important and require autoclaving and rolling techniques.

Some of the most significant advances will be made through more critical control of composition, impurities and processing techniques. The object will be to narrow the band of properties normally accepted by industry to insure consistent performance of a material under higher loads. Vacuum melting should improve quality substantially.

The development of improved manufacturing processes will be required, such as extrusion, rolling and forging, to make use of alloys with higher strength.

Better Tolerances—Aircraft gas turbine sheet materials require better tolerances. The weight reduction achieved by increased stress is sometimes small compared with what can be realized by reducing the tolerances demanded by the producing industry.

Weight estimates are based on maximum tolerances, while stress calculations are based on minimum tolerances. A sizable gain in weight reduction could be made if sheet tolerances could be halved.

Our requirements for future aircraft gas turbines also point to the need for materials with special properties. Some are:

1. Friable Material—

Needed is a material that will work well as a rubbing seal. It will be used to get closer clearance between compressor rotor blades and the casing. A rubbing seal material is also needed for the turbine. Reduced clearance on these parts improves efficiency substantially.

This material must be friable enough to rub away when it is in contact with the rotating blade or bucket. The blade or bucket should not wear or seize under these circumstances.

2. Oxidation Resistance—

As temperature in the gas turbine goes up, oxidation resistance becomes more of a problem. Needed are sheet metal components which resist oxidation to 2700°F. Most of today's high temperature alloys melt close to this point, so a ceramic coating is not in the picture.

3. High Strength Sheets—

Many sheet metal members which have been only gas carrying components in the jet engine will be required to carry high stresses. Needed: Materials for use at 1000 to 2000°F which can be fabricated into complex structures.

4. Turbine Bucket Alloy—

Needed is a material with properties of S-816 which can be used 300°F higher. Molybdenum alloys are getting into the picture, but they have poor oxidation resistance. Air cooled buckets are a possibility, but there are many construction problems. Substantial cooling air is needed.

5. Turbine Wheel Alloy—

With an increased turbine bucket temperature, the turbine wheel also gets hotter. Instead of a 1200°F alloy, chances are one that will stand 1500°F and can be forged into fairly large discs will be required.

6. Nozzle Alloy—

With increased turbine bucket temperature, the nozzle partition gets hotter. With the bucket at 1800°F, it may reach 2000°F. Although the nozzle partition has a relatively low thermal stress, it must stand severe thermal shock and must not warp or buckle.

7. Titanium Alloy—

Today's commercial alloys are good only up to 600°F under high stress. Needed is one that keeps its properties up to 1200°F.

8. Cermet—

Required is a ductile cermet that can operate as a turbine bucket, nozzle partition or other stationary component at 1500 to 2200°F. It must resist severe thermal shock.

9. Ceramic—

Needed is a ceramic for 3000°F which resists the erosion and severe pressure unbalance that exists in an afterburner. The objective is to reduce the cooling air that is needed for structural components.

10. Brazing Alloy—

Needed is one with higher fusing temperatures and better flow characteristics. We can use an alloy that would braze at 2400°F.

11. Bearing and Gear Alloy—

A material is needed to operate at high hardness up to 1000°F. A suitable lubricant must be developed.

Three New Jet Alloys

1. **W545 is an alloy of iron, nickel and chromium, with smaller amounts of molybdenum, titanium and boron. Ingots weighing up to 3500 lb are being made on a pilot plant scale at Westinghouse Electric Corp.'s metals manufacturing plant at Blairsville, Pa. W545 shows unusual promise as a high strength turbine disc material. When heated to 1200°F under a stress of 75,000 psi, test samples stood up 300 hours without breaking. Under equivalent conditions, say Westinghouse metallurgists, standard turbine disc materials would last less than 10 hours. The new alloy should permit an increase in operating temperature of a jet engine by as much as 100°F, which could mean about 100 more mph.**

2. **Incoloy T is an alloy of nickel, iron and chromium containing about 1 per cent titanium. It was developed by International Nickel Co., New York, as a strong sheet material for use up to 1400°F and even higher in some applications. The alloy has excellent oxidation resistance up to 1600°F. It's expected to find wide use in highly stressed parts of jet engine combustion systems. An excellent combination of formability and strength is obtained by process annealing components at 1800 to 1850°F, for 20 to 30 minutes, followed by rapid air cooling.**

3. **J1300 is an iron base alloy with a strength-to-weight ratio 25 to 40 per cent better than that of comparable alloys for the 1200 to 1400°F range, says its developer, General Electric Co., Cincinnati. The company's Aircraft Gas Turbine Division metallurgists report it has great potential where high strength sheets are needed at elevated temperatures, and it's also a good bar and forging alloy. Because of its demonstrated weldability and formability, GE says it plans to specify the new alloy for critical sheet components throughout the entire engine.**

both chemical and mechanical erosion.

Regenerative cooling of rocket engines fabricated from superalloys has proved to be successful with the liquid oxygen, nitric acid, alcohol and jet fuel type rockets. Such designs appear to be headed for trouble now that the new higher energy fuels are coming to the fore. They have lower heat capacities and higher combustion temperatures.

The answer may be ceramic coatings or linings used with the best cooling design. Several such materials, chiefly of the carbide or carbon type, have proved quite satisfactory for uncooled liquid and solid fueled rockets.

NUCLEAR POWER PLANTS

In looking at materials for nuclear power plants we have all the problems and requirements of conventional ones plus those introduced by radiation.

For the nuclear fueled turbojet engine, the temperatures and mechanical environments will be essentially the same as for the chemically fueled type. The amount of radiation received by engine materials will depend on the location of the reactor, the amount of shielding and the type of cycle used.

Hot Parts—Induced radioactivity may be a serious problem in re-usable engines requiring maintenance and overhaul. The solution may be to select or develop engine materials containing no elements which become dangerously radioactive for long periods after exposure to nuclear radiation.

The real promise for breaking through the power plant material situation lies with the higher melting but difficult to use materials which have not been fully exploited. But the choices are limited. Most promising are molybdenum, cermets, reinforced alloys and perhaps alloys of some of the high melting metals.

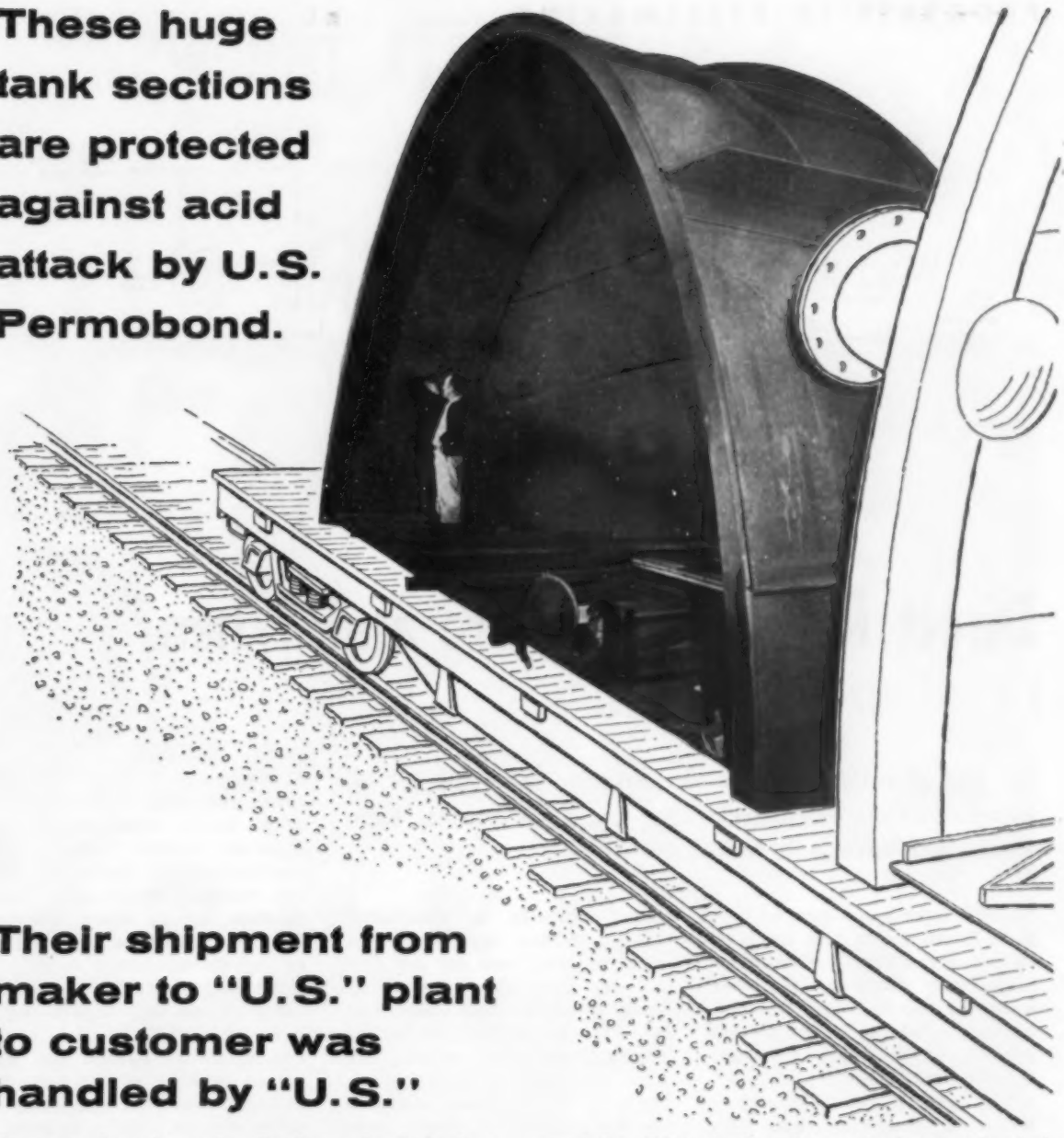
Problems—One of the most promising is the cermet. Turbine buckets made from cermets have operated experimentally under conditions beyond the capability of conventional superalloys.

Even so, progress is less than desired, and many reasons are advanced for a cautious approach to their use in engines. First, they are relatively brittle, and their properties lack predictability. Second, there is a general shortage of design know-how and production facilities. And third, the engine companies have indicated no firm requirements of significant magnitude for them.

Regardless of which direction research and development may take, turbine bucket and nozzle vane materials for use above 1650 to 1700°F are the key to future high performance turbojet engines.

• *An extra copy of this article and a companion article on metals for hot airframes, which appeared in* STEEL *last week, are available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

These huge tank sections are protected against acid attack by U.S. Permobond.



Their shipment from maker to "U.S." plant to customer was handled by "U.S."

The expansion plans of a Southern chemical plant called for the design of a processing tank that was so huge it could not be shipped in one piece.

So the steel fabricator's engineers, working with "U.S." engineers, designed the tank in 2 parts. The tricky task of transporting these immense sections from the fabricator to the "U.S." plant (where U.S. Permobond protective linings were installed) and from there to the chemical plant was *arranged* by "U.S." traffic specialists. When the 2 sections arrived at the chemical plant, "U.S." field service men vulcanized the joints after the halves were welded together, making a complete rubber lining with no seams or joints. Thanks to the Permobond® lining, the tank is immune to acid attack.

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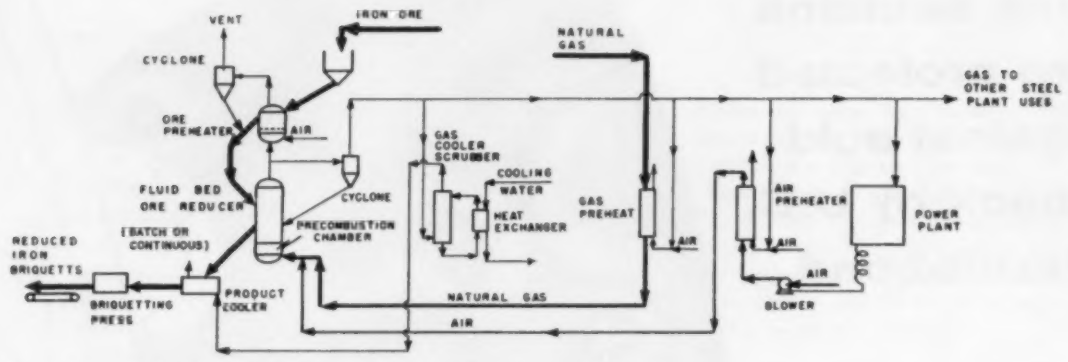


Flow sheet of the Esso-Little process for direct iron ore reduction

Direct Reduction: Where and When?

Dr. Old of Arthur D. Little Inc. estimates the potential for direct reduction and describes the Esso-Little process. Bethlehem finds savings in venturi gas washers

"SOME uninformed people have the silly viewpoint that the blast furnace is the weapon of an archaic industry ruled by prejudice, ignorance and fear, and that only an open mind can appreciate the importance of direct reduction. However, the facts are these . . ."

The speaker, Dr. B. S. Old of Arthur D. Little Inc., gave "the facts" to coke oven and blast furnace operators at the winter meeting of the Eastern Blast Furnace & Coke Oven Association in Pittsburgh.

The largest direct reduction plants now operating, either here or abroad, are small, Dr. Old said. In terms of capacity per unit, they are unable to provide enough iron to operate an open hearth. In the iron business, small units mean high costs; this is the basic economic factor which has worked to the advantage of the big blast furnace and to the disadvantage of direct reduction.

Coal Poor—In the traditional steel producing regions of the world in which iron ore and coking coal can be economically brought together, the coke blast furnace will continue to be the dominant reduction process. But there are growing industrial regions in which direct reduction can be justified. In these, there is a market for steel, and high grade ore is available, but coking coal for the conventional blast furnace cannot be obtained economically.

This is the sort of area where direct reduction already is operating. (The Tysland-Hole furnaces in Scandinavia; Krupp-Renn units in Europe and Asia; and the Wiberg shaft furnace at Soderfors, Sweden.) To become truly significant, a processing unit must be developed which can reduce 400 to 500 tons of iron per day, Dr. Old said.

Schemes—Dozens of direct reduction processes have been proposed and tried, including cylindrical retorts, rotary kilns, shaft furnaces, electric furnaces and combinations of shaft and electric furnaces, multiple hearth roasters, even a screw conveyor. Few of these have gotten much beyond the laboratory stage.

Arthur D. Little Inc. is developing a process with Esso Research & Engineering Co. based on partial combustion of natural gas with air to produce carbon monoxide and hydrogen. It continuously reduces iron ore with these gases in a fluidized bed reactor.

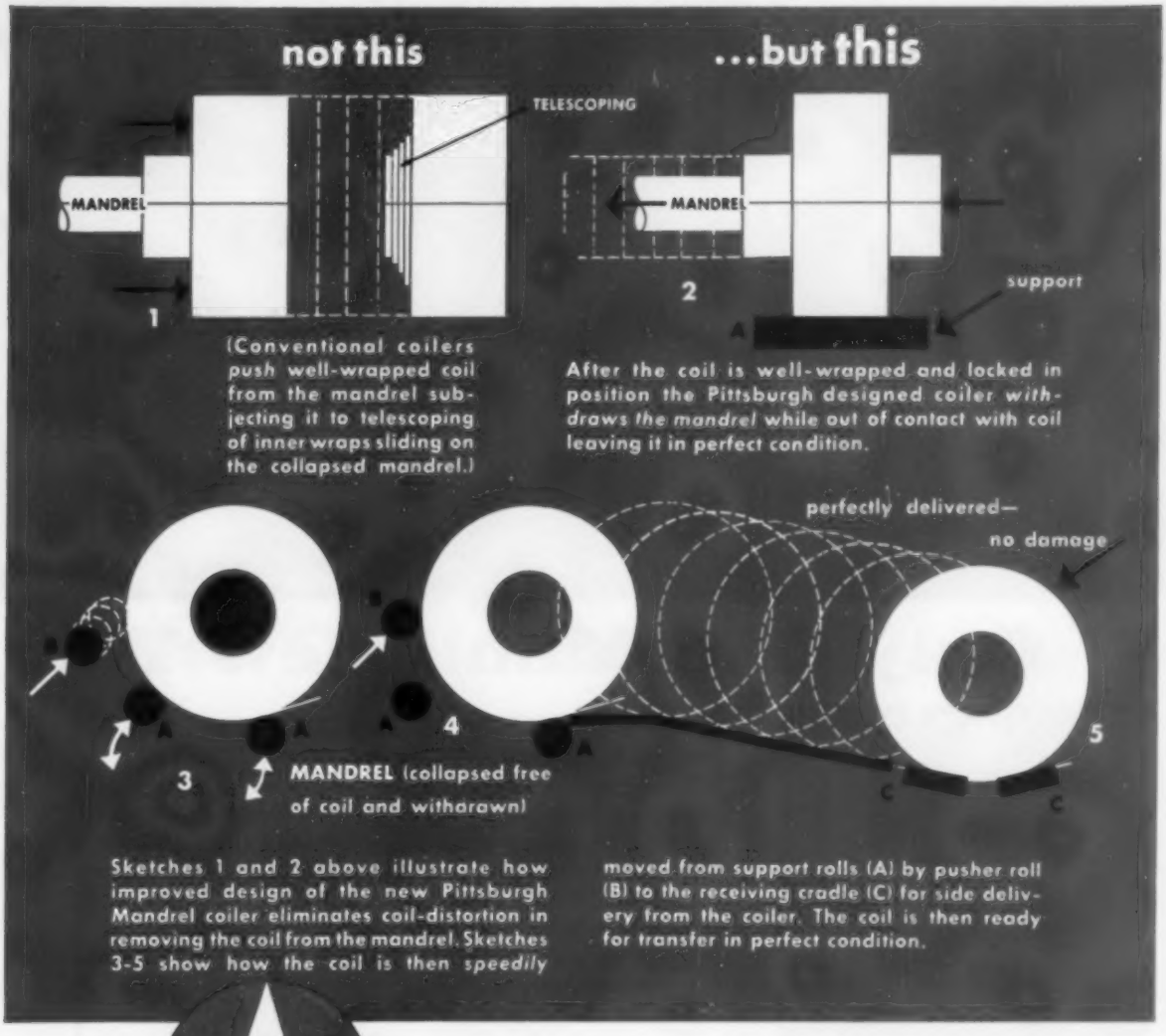
Dr. Old compared the Esso-Little process to the H-iron (Hydrocarbon Research and Bethlehem Steel Corp.) and Shipley (U.S. Steel) processes. One essential difference is that there is no recirculation of the reducing gas in the Esso-Little process, so it must operate at temperatures where reaction rates are fast, and must employ multiple stages of reduction.

Gas Washers—Venturi gas washers installed on Bethlehem Steel Co.'s A and E furnaces at Sparrows Point, Md., were de-

New hot strip coiler

by Pittsburgh

Delivers each coil in perfect condition



(Conventional coilers push well-wrapped coil from the mandrel subjecting it to telescoping of inner wraps sliding on the collapsed mandrel.)

After the coil is well-wrapped and locked in position the Pittsburgh designed coiler withdraws the mandrel while out of contact with coil leaving it in perfect condition.

Sketches 1 and 2 above illustrate how improved design of the new Pittsburgh Mandrel coiler eliminates coil-distortion in removing the coil from the mandrel. Sketches 3-5 show how the coil is then speedily moved from support rolls (A) by pusher roll (B) to the receiving cradle (C) for side delivery from the coiler. The coil is then ready for transfer in perfect condition.

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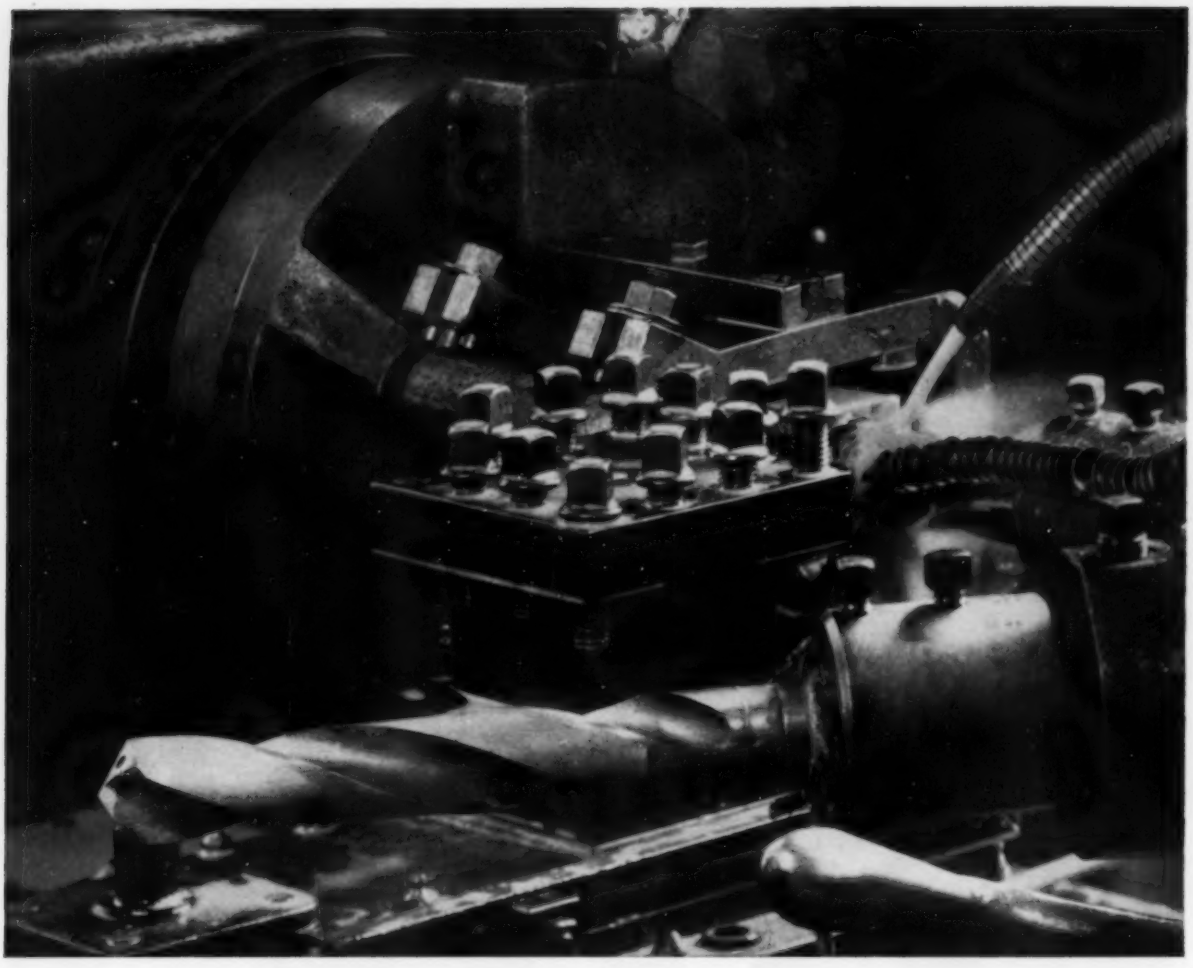

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TOP SPEED!

Everyone thought its production was satisfactory. But then someone in the front office decided to try ANTISEP.

The Houghton Man was called in. He looked the old lathe over, then prescribed a test run with ANTISEP Cutting Base. When he suggested the speeds and feeds to go with ANTISEP, everybody thought he was kidding. Either that, or he was out to break the old girl up.

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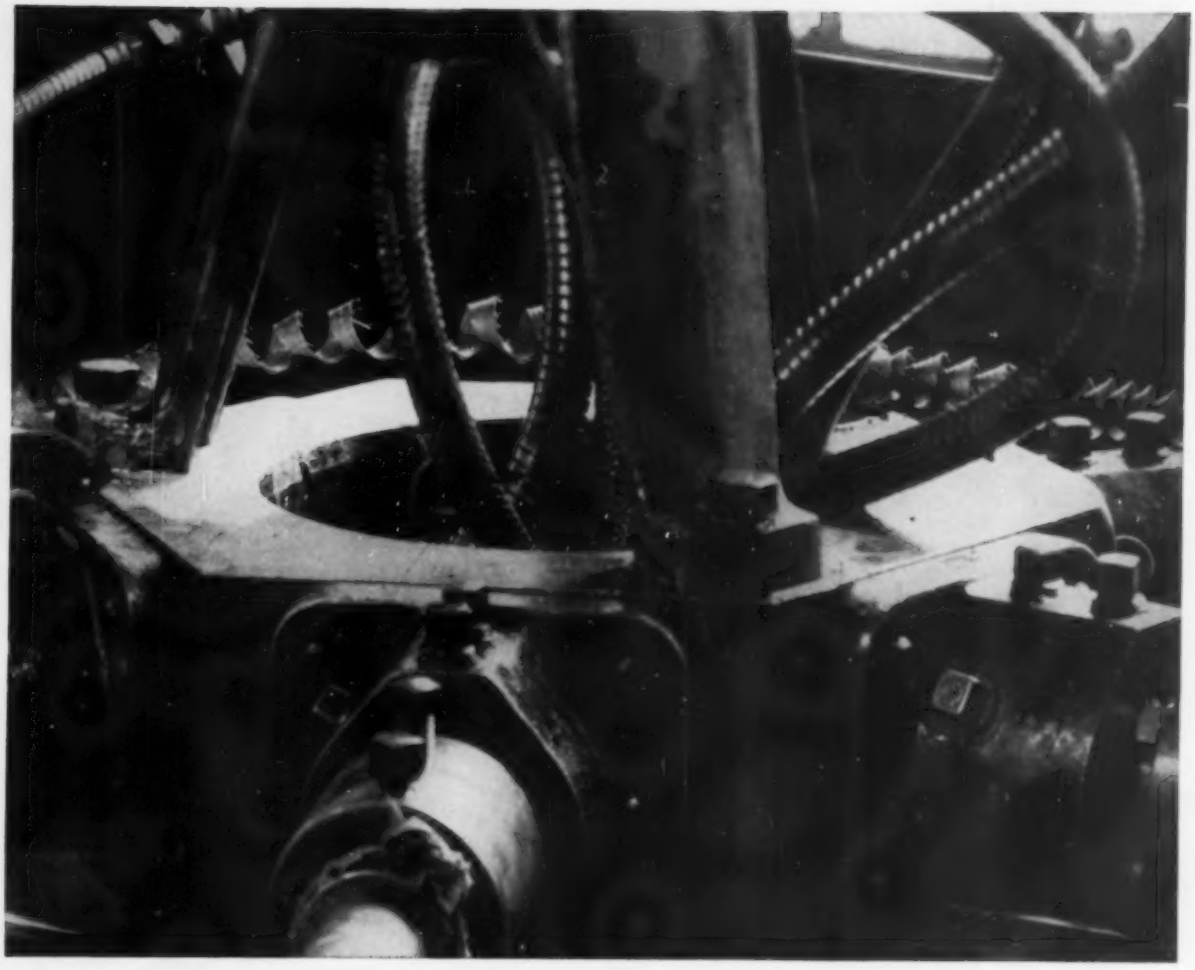

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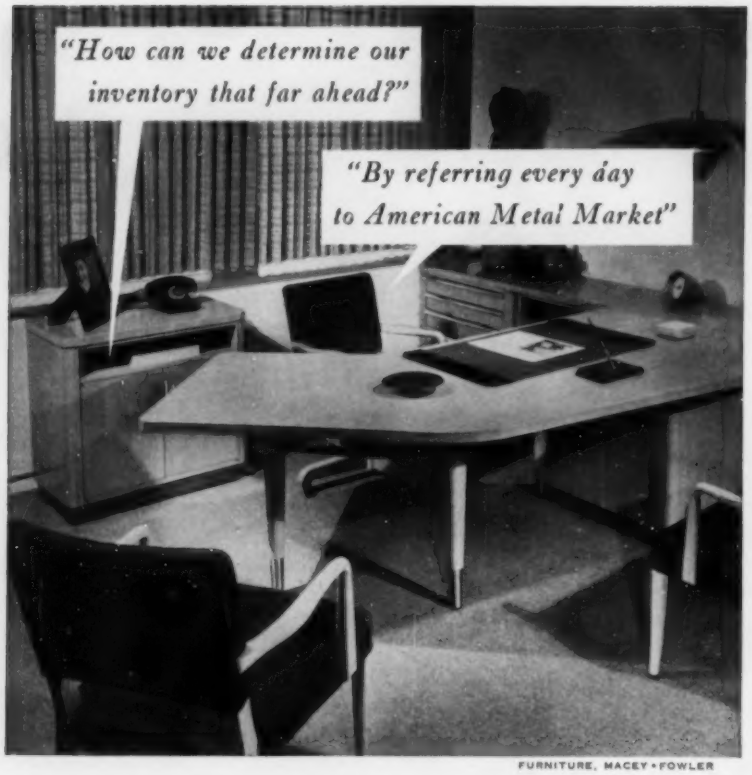

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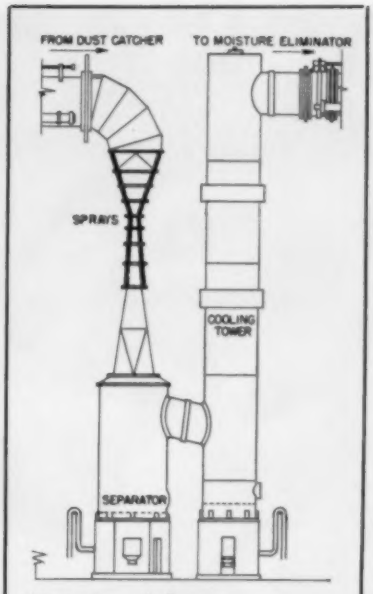

Venturi on A furnace, Sparrows Point

PROGRESS . . .

scribed by L. W. Butz, assistant superintendent, Blast Furnace Division. The two washers resulted in a seven to ninefold decrease in dust in the furnace flue gas.

The washer installed on A furnace in 1952 consists of a tower set into the gas system directly beyond the dust catcher. The venturi throat narrows from the 8 ft diameter of the gas main to a 1 ft x 5 ft 4 in. neck. From it the gas passes into a water separator, cooling tower and moisture eliminator.

Sprays—As it passes through the throat, the gas is sprayed with low pressure water entering perpendicular to the gas flow and high pressure sprays angled at 100 degrees with the flow. The water enters through 5/16-in. ID pipes, but the velocity of the gas is sufficient to atomize the coarse sprays, so no special nozzles are needed.

The venturi is lined with a fused-cast composition of aluminum oxide and chrome. An inspection after 21 months of operation showed a minimum of wear on the lining. In 41 months, there were no furnace delays attributable to the washer (the spray pipes have manual cleaning plungers that can be operated without shutting

IMPORTANT: For your convenience this sheet is perforated. Tear it out and "buck-slip" it to the proper man in your plant.

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Product Performance Report

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Cutting off 1⅛" diameter cold rolled C1020 steel. Dry cutting.

Project

Obtain greatest number of cuts per wheel. Increase production with economy of abrasive cut-off. Minimum burn consistent with wheel life.

Test

Use Carborundum Company new B7 Bond Cut-Off Wheel 16 x ⅛ x1 in the following grades:

A30-R-B7
A30-T-B7
A30-V-B7

Method

Stop watch contact time. Use a fast and steady pressure —do not stall machine. Measure wheel diameter start and finish. Make 24 cuts per wheel.

Results

Wheel	Number of Cuts Per Square Inch of Abrasive	
A30-R-B7	1.40	No burn
A30-T-B7	1.83	Brown burn
A30-V-B7	2.89	Blue burn

Customer accepted brown burn and decided on the A30-T-B7 grading.

Note

Carborundum, leader in abrasive techniques, backs up its products with trained sales representatives, a staff of competent field engineers and an abrasive engineering laboratory ... all available to you to put more sense in your abrasive dollar.

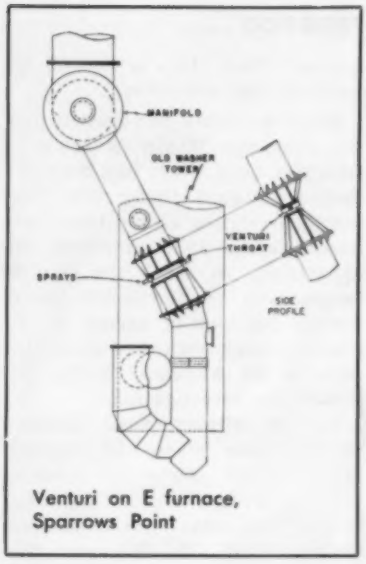
TRY ONE YOURSELF. A simple demonstration in your shop on any material you're cutting, will convince you that B7 Bond Resinoid Cut-Off Wheels will outperform any other wheels you can use.

Here is another in the series of Product Performance Reports being released by the Bonded Abrasives Division of The Carborundum Company. A color photograph of this actual operation is shown on the back of this page.

• *Ask your local distributor... or the man from*

CARBORUNDUM
REGISTERED TRADE MARK

703 PRINTED IN U.S.A.



Venturi on E furnace, Sparrows Point

PROGRESS . . .

down the gas cleaning unit).

Cleaner—The venturi replaces a conventional wash tower which was delivering gas to the primary mains with a dust content of 0.36 grain per cubic foot. Since installation of the venturi, top pressure on the furnace has been increased from 2½ to 3½-lb, flue dust rate has dropped from 190 to 87 lb per ton, furnace output has increased and fuel ratio decreased, and dust content of flue gas delivered to the mains has dropped to 0.048 grain per cubic foot.

Much of this improvement is attributable directly to the venturi. The improved cleanliness not only has a favorable effect on blast furnace recovery but also reduces gas line, precipitator and gas engine maintenance.

Simplicity—In 1954, Bethlehem fitted a much simplified version of the venturi into the pipes leading from E furnace into two standard wash towers. This installation has also been successful, resulting in a lowering of dust content in the gas from 0.38 to 0.04 grain per cubic foot. The company is planning to incorporate venturis in future furnace rebuilds.

As a footnote to Mr. Butz's paper, James R. Lowe, blast furnace superintendent of Jones & Laughlin's Pittsburgh Works, described J&L's experience with orifice plates in the gas mains as a low-cost method of getting the

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2 SHORT RUNS

TEMPORARY LOW-COST TOOLING! To produce something more than a few, but less than high production quantities, our simple contour dies—PLUS special purpose presses—keep costs low.

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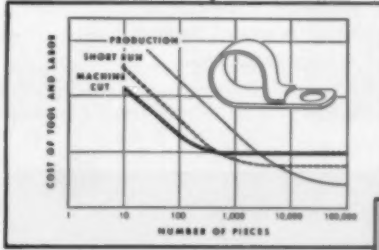

You can rely on it...WE LOOK AT ALL THREE—then determine the best method for fast, efficient, low-cost service. Let us quote on your next Stampings job.

Free 12-page booklet shows how to save on stampings... write for it.

STAMPINGS DIVISION

"One Piece or a Million"

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Here's a good picture to back up your fluxstone needs

Presque Isle, Michigan
—where Chemstone operates quarries and plants for 5 major steel companies under a long term management contract.
Marblehead, Ohio
—a 3000-acre operation including quarries, plants, rail-dock-boat facilities.
Cleveland, Ohio
—Chemstone main office, technical sales, customer service.
Pittsburgh, Pa.
—where Neville Lime Co. handles technical sales and service.
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—Research Center where metallurgical limestone work never ceases.
Strasburg, Va.
—site of plants, and deposits that are among the highest calcium-content limestones in the U. S.

The map and legends show why you can buy fluxstone to better advantage from Chemstone.

1. Dependable Deliveries—Chemstone is big, in ratio to steel itself. Multi-plant set-up, great capacity, integrated shipping facilities mean fast, sure deliveries to meet steel mill schedules.
2. Finest Quality Fluxstone—noted for uniformity of size, strict adherence to specifications, controlled top quality that is time-honored in the trade.
3. Technical Service, Research—skilled help from steel-wise technologists wherever needed.

Chemstone—and its parent company, Minerals & Chemicals Corporation of America—is geared to give steelmakers full service. Your inquiry is invited.

WORLD'S LARGEST NON-CAPTIVE FLUXSTONE PRODUCER

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a subsidiary of
MINERALS & CHEMICALS CORPORATION OF AMERICA

Pittsburgh, Pa. Representative:
NEVILLE LIME COMPANY
Oliver Building

PROGRESS . . .

venturi effect. J&L is getting 90 per cent dust reduction.

Blow In—Blow-in practice at the Aliquippa Works of Jones & Laughlin Steel Corp. has been reflected in good lining life. The complete relining of two blast furnaces during 1956 presented an opportunity to check the rise in temperature of the brick lining during the blow-in period. A. T. Sadler, superintendent of blast furnaces at the Aliquippa Works, described the investigation.

During relining, four thermocouples were placed 90 degrees apart, 2½-ft above the mantle, with one directly over the tap hole. Four additional thermocouples were placed 12½-ft over the mantle with their axes rotated 45 degrees from the first row. All were set approximately ½-in. in from the hot face.

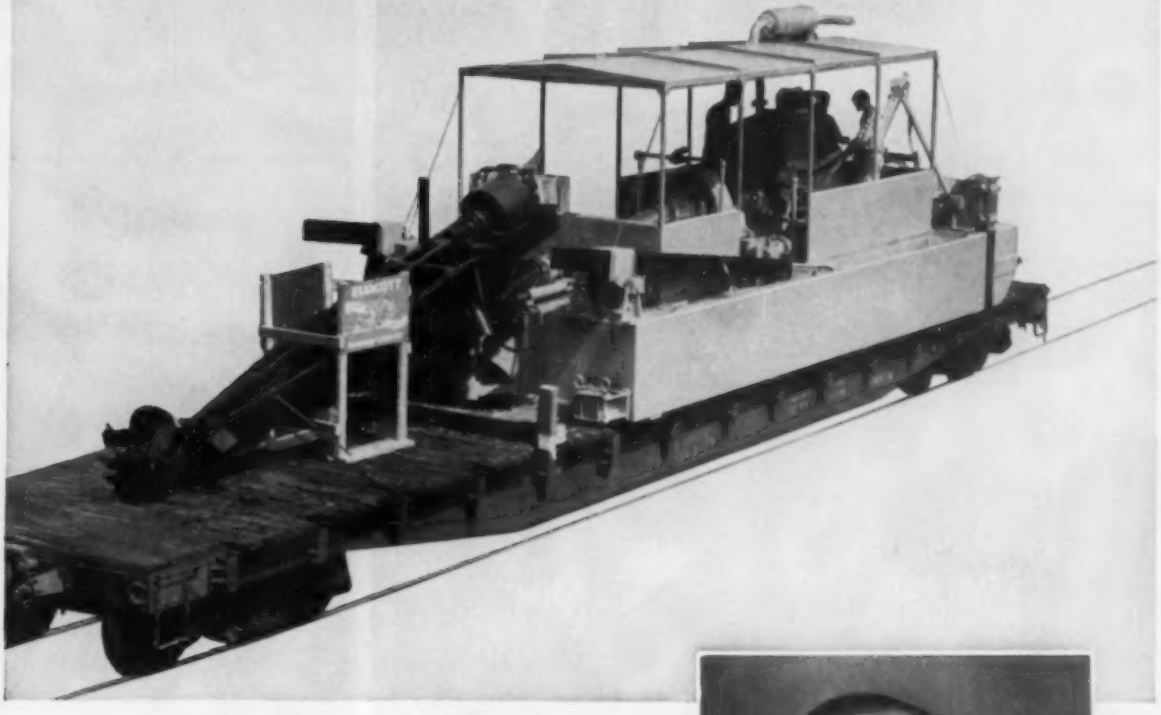
Sequence — Aliquippa blow-in practice starts with a coke fire dry out period (three days for a mantle-to-top relining, longer for a full reline). From 16 to 20 hours before wind-on, tuyeres are installed and clayed up. The furnace is filled by skip with coke, stone and blast furnace slag with a few charges of light burden on top. Tuyeres are then allowed to natural draft for several hours.

Wind is then put on every other tuyere at 3 to 4 lb pressure for 24 hours. The wind rate is then increased slowly to approximately 65 per cent of full value 72 hours after wind-on. Blanked tuyeres are opened one at a time as blast pressure reaches 12 to 13 psi, and wind rates are slowly increased to full wind values.

Temperatures — Both furnaces showed a fairly uniform rise in temperature, with maximums (slightly over 2000°F) being reached within 26 hours after wind-on. The fastest rate of rise was between the 5th and 18th hours. Greatest temperature rise in one hour was 160°F, with the average between 100 and 120°F.

Measurements indicate that the critical period of temperature increase is in the first 24 hours of the blow-in if the increase is held below 200°F per hour up to 2200°F. Above 2000°F, the rate of temperature rise is not harmful.

An Ellicott "Dragon" Dredge, constructed in part with Standard Steel Works forgings, ready for rail and freighter shipment to Hong Kong.



"To maintain our position of world leadership we must have superior service from our suppliers"

As suppliers of countless forgings to the Ellicott Machine Corporation for 30 years, we at Standard Steel Works feel we have been an integral part of the growth of Ellicott and in helping this world's largest dredge manufacturing company maintain its top position through all those years. We appreciate the fact that Mr. Mund and his associates realize it is not only by meeting design and steel analysis requirements for Ellicott, but also by consistently combining our know-how in steel fabrication with personalized attention to each order, that we have maintained our mutually satisfactory relationship. Every order we receive we accept as a service opportunity.

It is routine at Standard Steel Works to analyze all orders carefully and to present its requirements and possible problems on a personal, conference basis to the appropriate men in the shop; then to keep the customer continually advised on the progress of his order through our shops by means of frequent, periodic job-status reports. Our customers, whether they manufacture equipment for local use or for shipment to the far corners of the world, know that they can count on Standard Steel Works to deliver the right forgings at the right time—to help them maintain delivery schedules. Write or call Dept. 2C today and give us the opportunity to show you how our personalized service can prove invaluable in your operations.

"We are justly proud of our position as the world's largest designers and manufacturers of hydraulic dredges. Standard Steel Works is one of our suppliers which—in giving us that extra plus, superior service, while meeting our requirements for various forgings—have helped us maintain our world-wide leadership," says Allan Mund, Vice President and General Manager, Ellicott Machine Corp., Baltimore, Md.

Standard Steel Works Division

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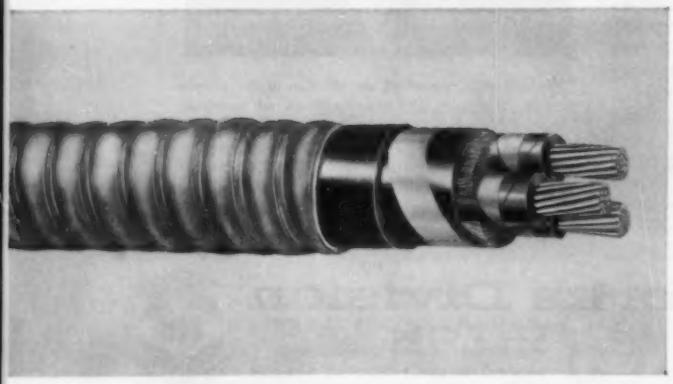
BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

For air conditioning: Three conductor, 500 Mcm, 37 wire, 6/64" varnished-cambric insulated Anaconda Duralox Cable was quickly, easily installed in older building

PROBLEM: Installing new circuits in old building

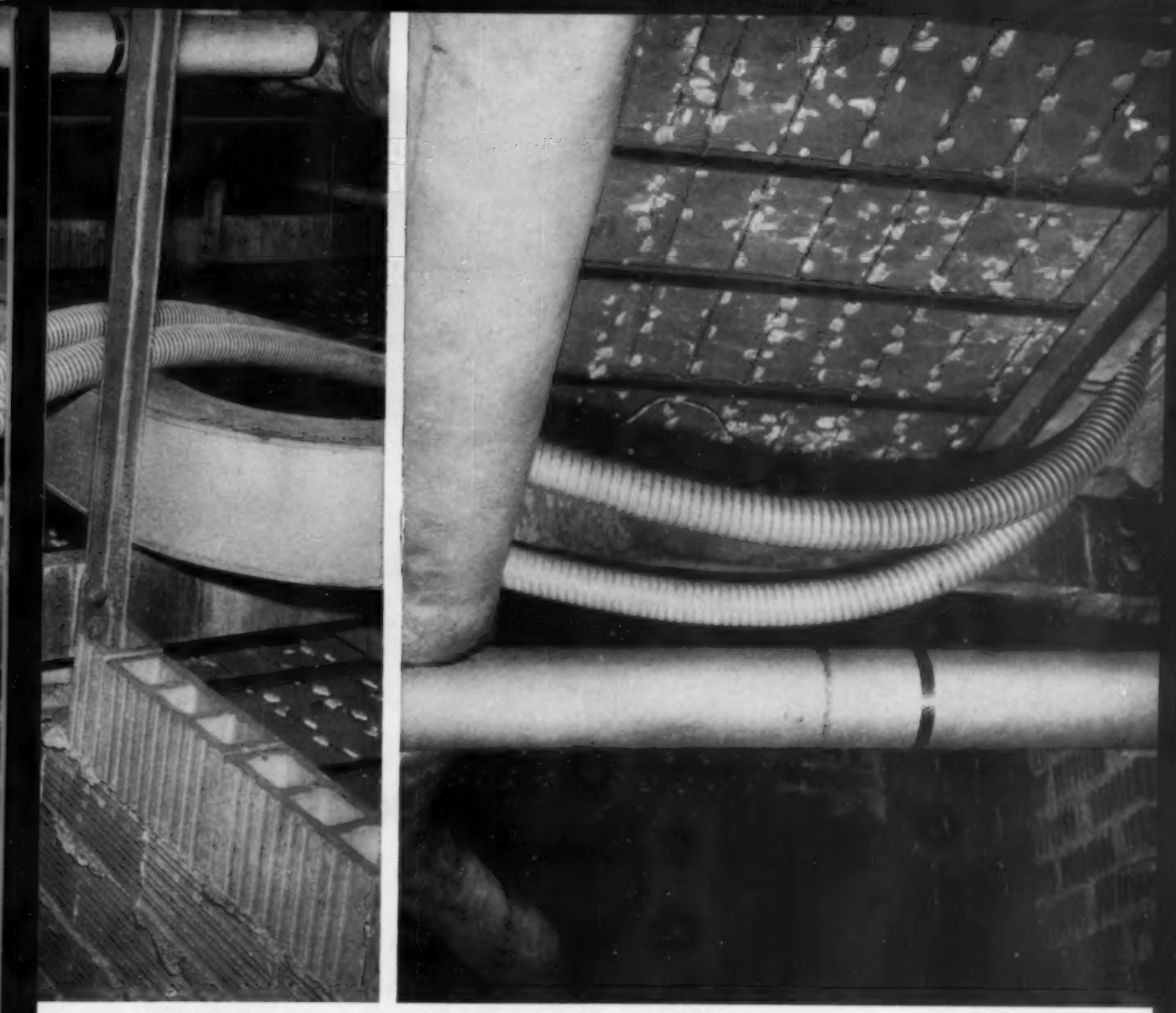


Anaconda Duralox Interlocked-armor Cable.

Installing new circuits in an old building – whether for air conditioning, as the case here, or for new machinery or new load centers – can be tough and costly. You either have to go around existing obstructions, a laborious job with rigid conduit, or remove them.

The ideal solution is Anaconda Duralox Interlocked-armor Cable.

Because it is flexible, Duralox Cable is quick, economical to install – indoors or out – with simple supporting devices. It trains easily around corners, columns and other obstructions in *long, unbroken*



to handle new load. Cable runs from breaker box in west wing (left) through loft of roof (center) to side wall of building and down wall (right) to breaker box on lower floors.

SOLUTION: Duralox Interlocked-armor Cable

or: *How to do a hard job the easy (and low-cost) way*

runs. Circuits are easy to relocate . . . always accessible. Duralox's interlocked metal-tape armor affords excellent protection against mechanical damage.

Anaconda Interlocked-armor Cable is available in sizes No. 6 Awg to 750 Mcm – copper or aluminum conductors – up to 15 Kv. Underwriters' approved for 600 volts and 5000 volts. With rubber, plastic, or varnished-cambric insulation.

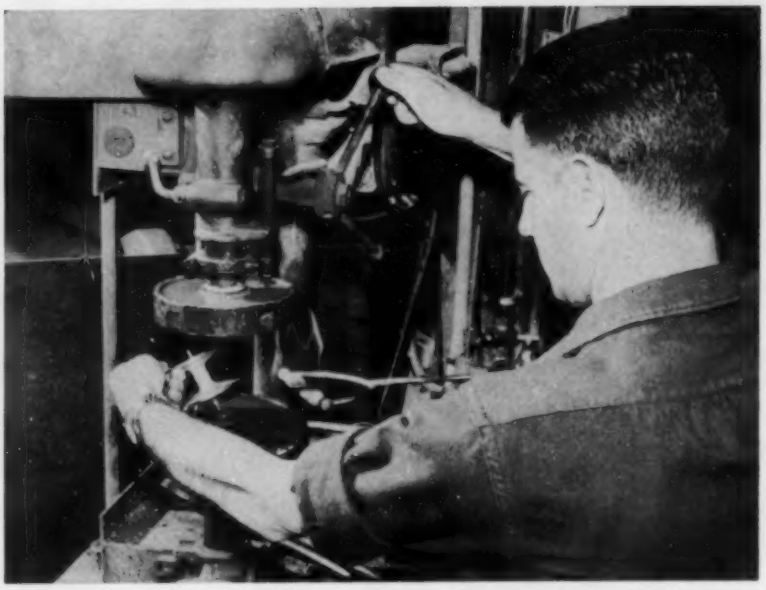
NEW BULLETIN DM 5606 on Anaconda Duralox Cable gives you full information. Write for your copy today. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

57495

ASK THE MAN FROM **ANACONDA®**

FOR **INTERLOCKED-ARMOR CABLE**

A fishing equipment manufacturer redesigned his deep sea reels for brazed assembly because staking pins wouldn't take the high compressive forces of nylon line

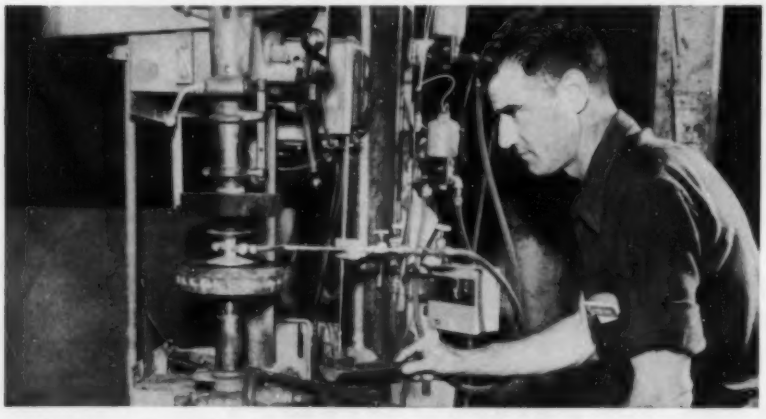


Placing assembled spool in brazing fixture. Brazing machine consists of opposed drillpress heads countershafted to assure synchronous rotation

Brazing Strengthens Brass Spools

SOON AFTER the advent of nylon fishing line, the Montague-Ocean City Rod & Reel Co., Philadelphia, found it would have to change the design of its reels to withstand the flange-spreading forces created by tightly wound nylon line.

Originally, the spools were assembled from two finished halves, with the bored hub of each half fitted over a solid steel spindle. Each spool half was secured with two 3/16-in. stainless dowel pins press fitted through the diameter of the hub and spindle.

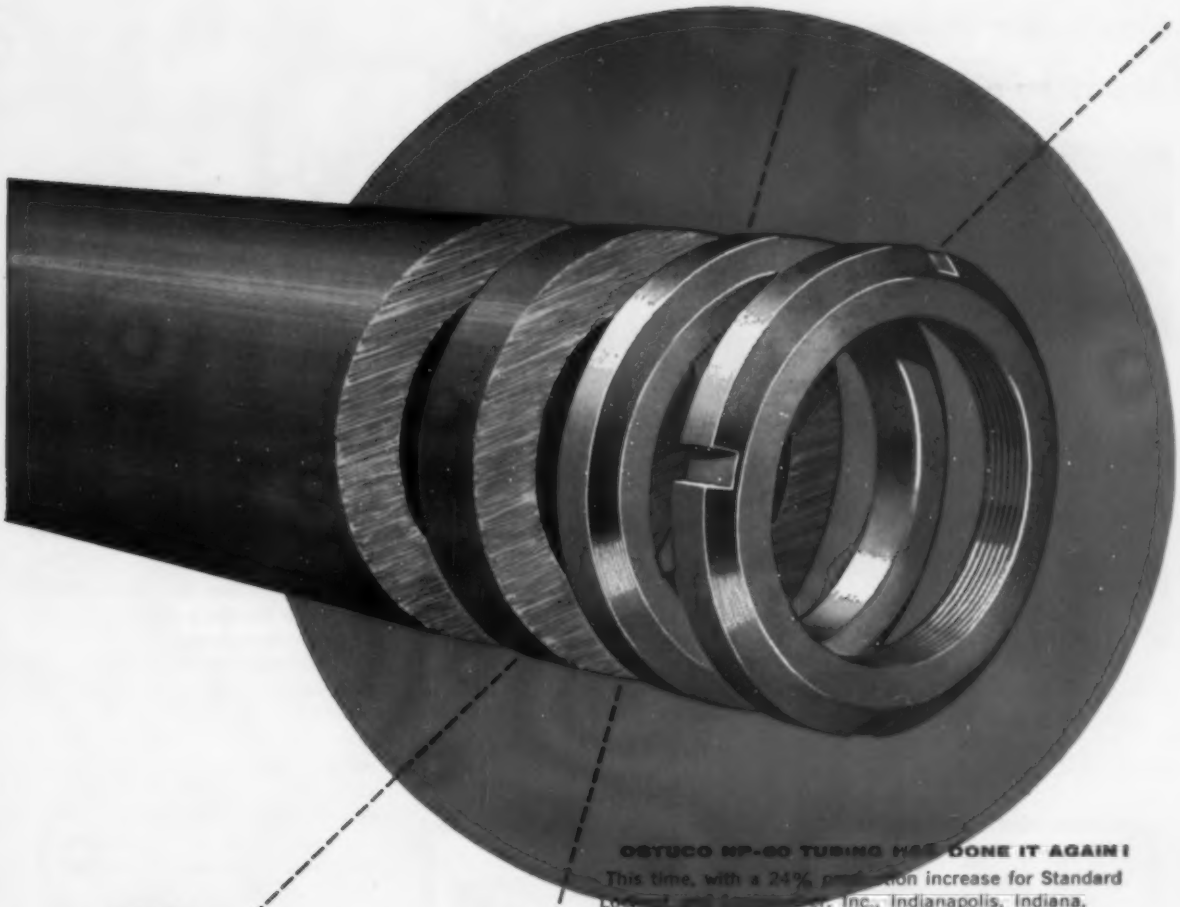


Sliding burner assembly into position. Dead weight of upper platen assures accurate joint fit when ring of brazing alloy melts

In some cases, the compressive forces of the line were great enough to spread the flanges of the spool so that it bound against the reel housing. In extreme cases, the dowel pins were sheared and the holes in the hubs badly elongated. On one occasion, the hub was necked down 0.012 in. before the pins let go.

Redesign — To strengthen the spool, Ocean City silver brazed the two half-spools directly to the spindle. The shear strength of a good brazed joint exceeds 40,000 psi.

Compared with an assembly held together by two double shear loaded steel pins, the greater surface area of the brazed joint is much



24% Production increase at Standard Locknut & Lockwasher, Inc. after switching to OSTUCO NP-60 tubing

OSTUCO NP-60 TUBING HAS DONE IT AGAIN!

This time, with a 24% [illegible]ion increase for Standard Lock[illegible], Inc., Indianapolis, Indiana. Tubing experts from OSTUCO recently recommended a switch to NP-60 Tubing specially processed for machineability for Standard's locknut and lockwasher line used in ball and roller bearing applications.

Standard components find their way into electric motors, machine tools, automotive, aircraft, farm and construction equipment. Other companies, with equally diverse applications, report similar success with NP-60. If you are machining bearings, washers, collars, or any circular part, you'll do well to check into the merits of OSTUCO's new NP-60 seamless steel tubing.

GET NP-60 WITH "SINGLE-SOURCE SERVICE."

New NP-60 seamless tubing comes to you with OSTUCO'S unique "Single-Source Service"—experience and facilities for design and development, production and delivery all under one roof. Get together with a tubing expert for preliminary planning on NP-60's possibilities in your product. Contact your nearest sales office or write direct to the factory.

OSTUCO SHELBY, OHIO

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SEAMLESS AND ELECTRIC RESISTANCE WELDED STEEL TUBING—Fabricating and Forging

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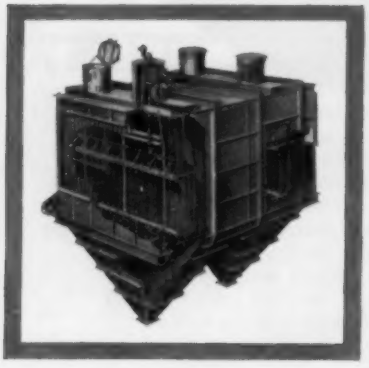
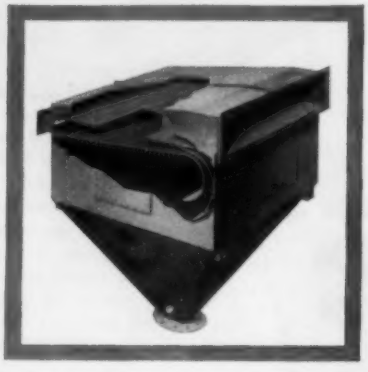
Mastering the double-eddy dust devil leads to extra dust collection efficiency!

DUST IN THIS PART OF THE DOUBLE EDDY WHIRLS UP IN ALL CYCLONES...
BUT BUELL'S EXCLUSIVE "SHAVE-OFF" TRAPS IT...
HARNESSES THE "DUST DEVIL" FOR EXTRA EFFICIENCY!

Other design features which increase efficiency include large, clog-proof diameter, proper proportioning for maximum dust separation, extra-heavy-gauge, wear-resistant construction . . . features which shave dust collection costs to the minimum!



Buell SF Electric Precipitator also delivers *extra dust collection efficiency*, due to unique Spiralectrodes and Continuous Cycle Rapping.



Buell Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or mechanical draft installations.

For more specific data about Buell's *extra efficiency*, write Dept. 26-C, Buell Engineering Company, 70 Pine St., New York 5, N. Y.

buell®

MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

Silver brazed spool halves provide increase in strength because of solid joint formed between bore of spool and spindle

BRAZING STRENGTHENS . . .

more effective in preventing the hub from creeping toward the ends of the spindle when under compression.

Brass Spools—The spool halves are brass forgings (Mueller Brass 200), stress relieved at 800 to 900° F to prevent warping during the final machining. Because of the tight clearance between the spool and reel, machining tolerances on the diameter of the flanges are held to ±0.002 in., the face of the flanges are held true within ±0.0015 in. of the centerbore line, and the width of the flanges within ±0.0025 in.

Final machining is done after the spool is brazed. Machining done before brazing consists of finishing the outer surface of the flanges, boring the inner diameter of the hub to size, facing off the butting edges of the hubs and countersinking a shallow socket in each joint face to accommodate the preplaced ring of Handy & Harman's Easy-Flo #45 silver brazing alloy.

Force Fit—The first assembly step is pressing the spindle, with a ring of 1/16-in. brazing wire around it, into one of the spools. The spindle, alloy ring and spool bore are coated with Handy-Flux so the internal surfaces of the joint will get an adequate amount of flux as the spindle is forced into position.

To compensate for the difference in thermal expansion of brass and steel, a force fit between the hub and spindle is necessary at room temperature to get a clearance of about 0.003 in. at brazing temperature.

The mechanical assembly is

new electro-ground carbide end mills

manufactured by **ELGIN**

Elgin GOLDEN CIRCLE Carbide End Mills . . . solid carbide, of course, for the toughest jobs. But most important, Elgin Golden Circle End Mills are ground by Elgin's new Electro-Grind process which completely eliminates the strains and grinding checks caused by conventional methods. No chance for chipped or flaked cutting edges caused by high temperatures during grinding!

Electro-Grind combined with the use of extra fine grit wheels gives the sharpest, smoothest cutting edges yet—your assurance of the highest quality tools obtainable, increased production, less frequent regrinding, greater accuracy.

Write for new catalog showing complete line of solid carbide end mills, drills, reamers and burs—in stock for immediate delivery.

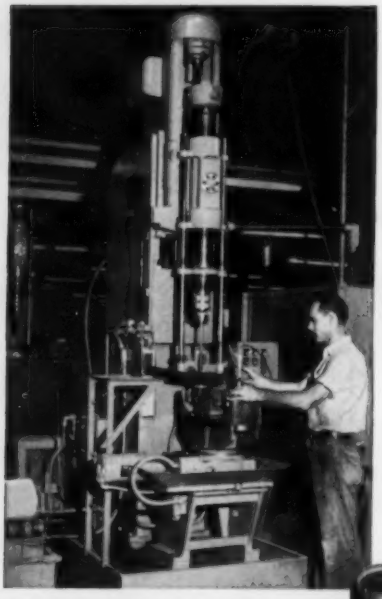
Abrasives Division

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

WHY Emerson Electric MICROHONES Laminated Steel Rotors

The Emerson Electric Manufacturing Company is constantly searching for the best possible processing methods. Working with Micromatic engineers on problems encountered in processing shaft holes in their laminated steel rotors, Emerson Electric found that Microhoning would provide much higher production quality while lowering processing costs. The following Microhoning benefits are now obtained:



Model 728 Hydrohoner with automatic Microsize, Microdial and two station rotary indexing fixture. Hole Tolerances: Diameter .0002 inch, straightness and roundness .0001 inch.

CUT REJECTS
With former processing method rejects ran too high. Microhoning controls size and assures a clean hole—rejects are substantially reduced.

ELIMINATED OPERATIONS
Old processing method required two operations. In one operation, Microhoning generates size and straightness within specified tolerances.

REDUCED BALANCING TIME 70%
To preclude vibration and poor operating characteristics, it is essential that shaft hole be concentric with O.D. of rotor. Microhoning reduced by 70% the amount of dynamic balancing correction required.

PROCESSING COSTS CUT 70%
Current figures show the cost of Microhoning shaft holes in rotors to be less than 30% of processing by old method.

Rotors (from 2¼ to 4 inches long) are all Microhoned on the same machine by changing adaptor in fixture and resetting stroke length.

Learn why Microhoning will give you efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

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MICROMATIC HONE CORP.
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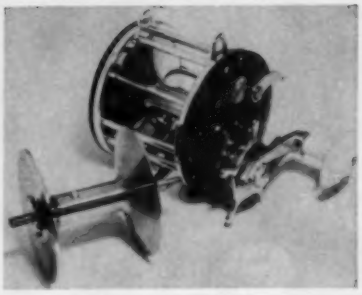


Finished spool and complete reel assembly. The small pin on the spindle provides a convenient anchorage for the line

BRAZING STRENGTHENS . . .

completed when the second half spool is pressed onto the spindle, with the ring of brazing alloy sandwiched between the mating edges of the hubs.

Brazing Setup — The assembled spools are brazed on a machine devised by Ocean City production engineers. Two drillpress heads were mounted on a common support post with the lower head inverted. A pair of flywheels, mounted on the spindle of each head, serve as the two halves of the brazing fixture.

The drive gears of the two press heads are countershafted together to synchronize their rotation and prevent torsion between the two halves of the spool during brazing. The driveshaft rotates at 18 rpm.

The spool assembly is positioned in the fixture with the ends of the spindle inserted in sockets to assure alignment. Sockets are lined with asbestos cement bushings to keep the ends of the spindles from sticking to the fixture due to excess flux or droplets of alloy.

Burners—Ocean City made the burner assembly from a pair of multiport Monel-tipped burners, the type used for tipping off radio tubes. They are mounted at the ends of a Y-shaped fuel line of ⅜-in. pipe. The fuel supply (city gas and oxygen) is proportioned manually by needle valves on the feeder lines and passed through a mixing valve before entering the Y.

The yoke is mounted on a vertical post by a screw clamp which provides a quick and simple means of adjusting the height and horizontal reach of the burners to suit ten sizes of spools. The vertical

ten sizes of spools. The vertical support post is mounted in a base which slides back and forth along a track to let the operator advance and retract the burners at the beginning and end of the heating cycle.

Brazing Cycle — The operator slides the burners into heating position and starts the timer which operates solenoid valves that turn on the fuel flow and fixture drive motor. The heating time and machine rotation are timed to permit the heat to soak through the brass hub into the spindle. This assures complete melting and uniform distribution of the silver filler metal along the spindle and inner diameter of the hub.

The weight of the upper flywheel and drillpress spindle assembly closes the joint between the two halves when the silver brazing alloy melts.

Low Heat — The low melting point of the silver brazing alloy (melting point is 1125°F, flow point is 1145°F) prevents annealing the brass flanges. Since the alloy flows by capillary action (not gravity), it goes upward as well as downward and wets the vertically orientated spindle for equal distances from the center of the joint.

At the end of the heating period (about 40 seconds for the smallest spool), the timer-operated solenoid shuts off the oxygen supply and 95 per cent of the gas flow, leaving only a pilot flame. The fixture continues to rotate, to air cool the assembly, until the operator is ready to remove it. (Quenching the spool would change the temper of the brass.) Production is 20 to 30 spools an hour.

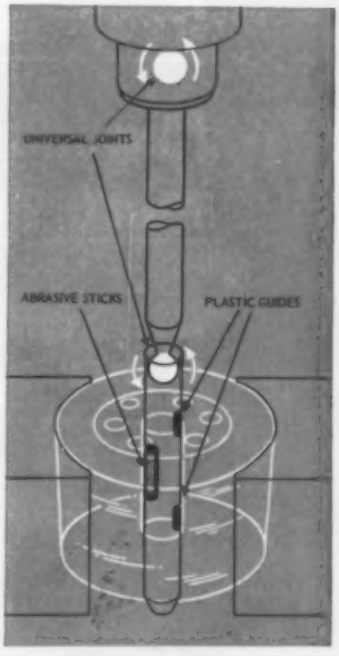
Cooling—A simple, but effective, cooling system keeps fixture platens cool during prolonged periods of operation and draws off some of the heat from the flanges. The edges of the flywheel are flanged about ¼-in. deep, forming a natural pool which the operator keeps filled with water. Much of the heat that ordinarily would be absorbed by the fixture is dissipated by evaporation of water.

After a rinse to remove flux and descaling, the inside faces of the spool and the hub are finish machined. Plating completes the spools.

HOW MICROHONING Laminated Rotors Cuts Processing Costs

Emerson Electric squirrel-cage rotors are made of special "electrical grade" steel laminations and each lamination is coated with oxide insulation. In processing the rotor, the O.D. is turned concentric with the shaft hole. Then, in one operation, Microhoning accurately generates finished size and straightness of shaft hole without any change in hole location.

The Micromold tool has two universal joints in the drive shaft which allow the tool body to align itself with the shaft hole. Microhoning of holes is along same axis from which O.D. was turned.



For electrical and mechanical efficiency, assembled motors must have a uniform air-gap between rotor and stator of .006 inch to .011 inch. Because laminated surface is rough and close tolerances must be held, special guided Micromold tools are used. Plastic guides above and below abrasive sticks, control dressing of abrasive and assure generation of round, straight shaft holes.

Before installing Microhoning equipment, two operations were required to finish shaft hole—rejects ran high. Microhoning greatly reduced the amount of dynamic balancing correction required.

The principles and applications of Microhoning are explained in a 30-minute, 16 mm, sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

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COMPANY _____
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MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

FLUXING STONE

100,000,000 Tons plus

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*According to Analysis by Pittsburgh Testing Laboratories.

Norfolk and Western RAILWAY

AIME Spring Meeting

Program puts heavy emphasis on improved efficiency and new steelmaking methods

A COMPREHENSIVE program is planned for the 40th annual conference of the National Open Hearth Steel Committee.

It'll run concurrently with the annual conference of the Blast Furnace, Coke Oven & Raw Materials Committee of the American Institute of Mining, Metallurgical & Petroleum Engineers at the Penn-Sheraton hotel, Pittsburgh, Apr. 8-10.

The programs include papers on the operation, metallurgy and physical chemistry of open hearth furnaces and the theory and operation of blast furnaces and coke and by-product plants:

Monday, Apr. 8—Blast furnace: Bosh construction and bosh tuyeres, stack cooling plates, top construction, tuyere development at Bethlehem, orifice plate gas washer, H-iron, behavior of chromium in slag-metal systems under reducing conditions, pig iron smelting in the electric furnace with pre-reduction.

Coal and coke: Symposium on maintaining a coke plant during curtailment of operations.

Basic open hearth: Symposium on open hearth operations during forced interruptions, results with high firing rates, Australian open hearth design and operation.

Acid open hearth: Effects of improved combustion in a small cold metal shop, European acid steelmaking.

Operating metallurgy: Continuous casting of carbon steel, metal flow rates through nozzles.

Refractories: New approach to open hearth maintenance, prefabricated open hearth fronts, roof patching, pouring refractories, cast hot top linings.

Tuesday, Apr. 9—Ore Agglomeration: Loading and stockpiling taconite pellets, updraft sintering, theory to the aid of sinter making, sinter mix distribution by swinging spout.

Coke by-products: By-product industrial waste guide, biological

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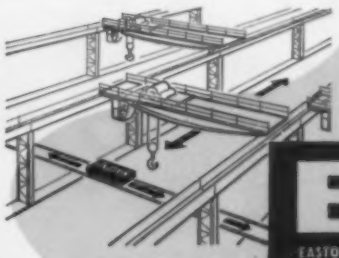
Above: 25-ton car, gasoline-hydraulic



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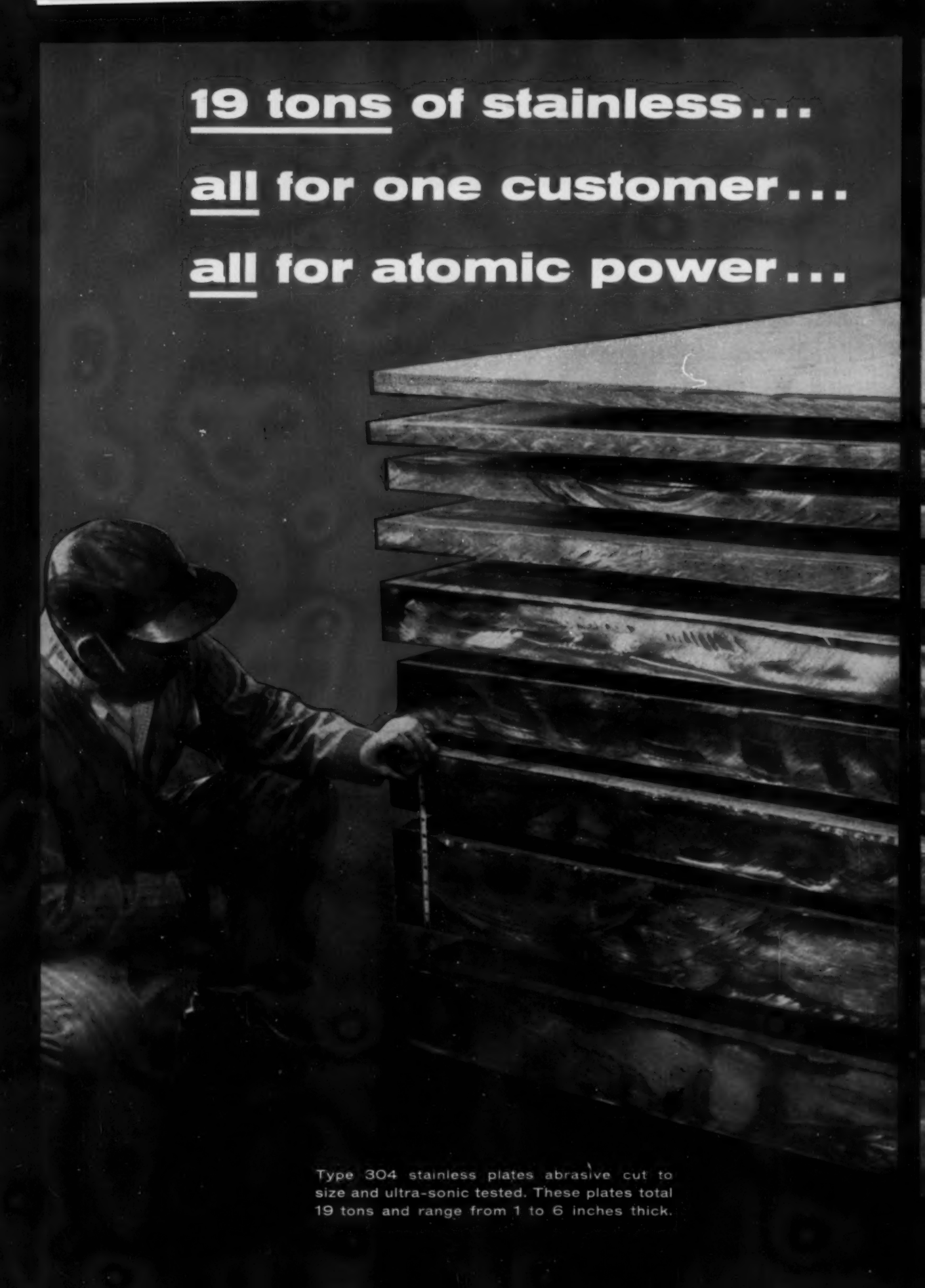
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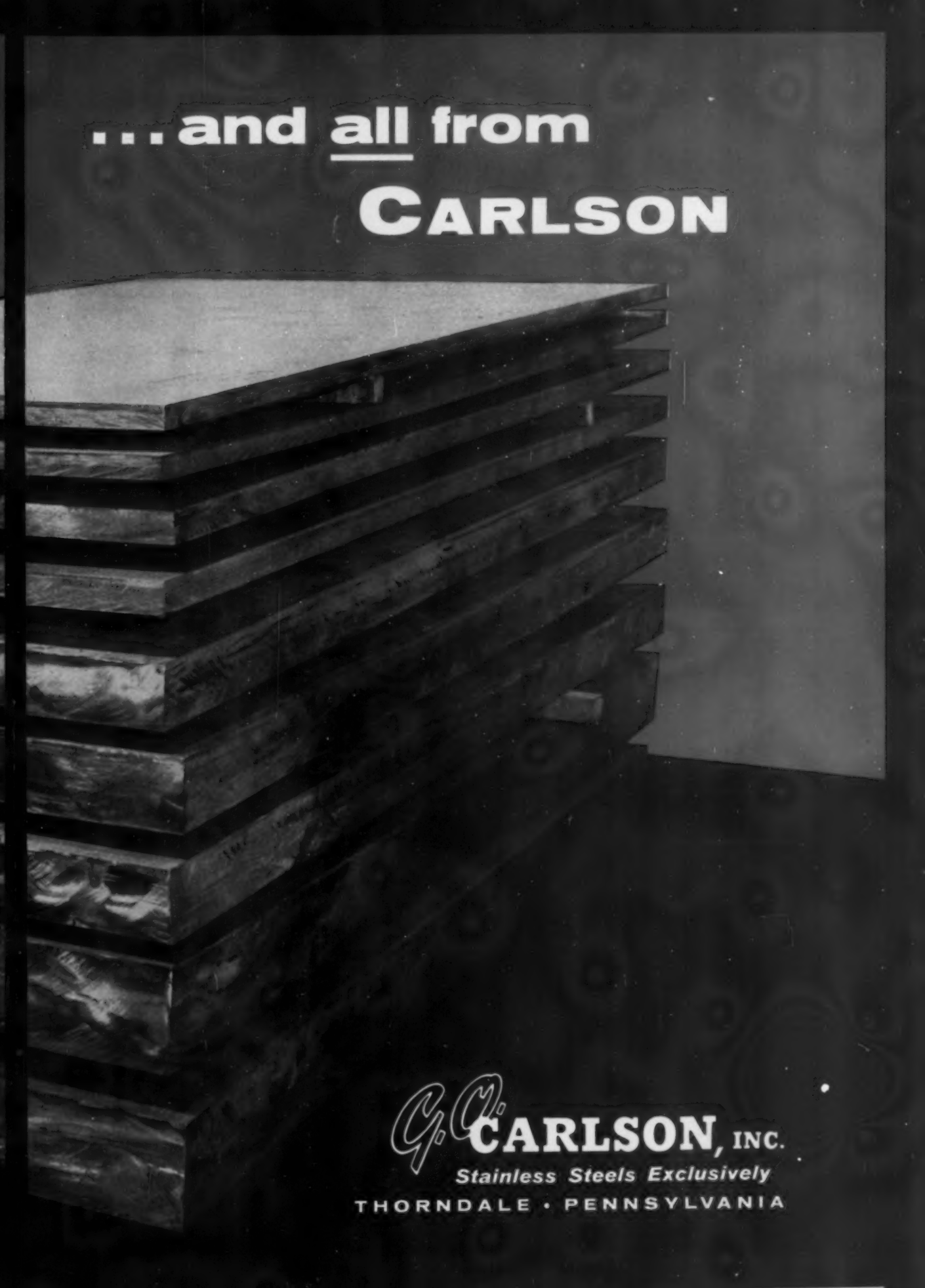

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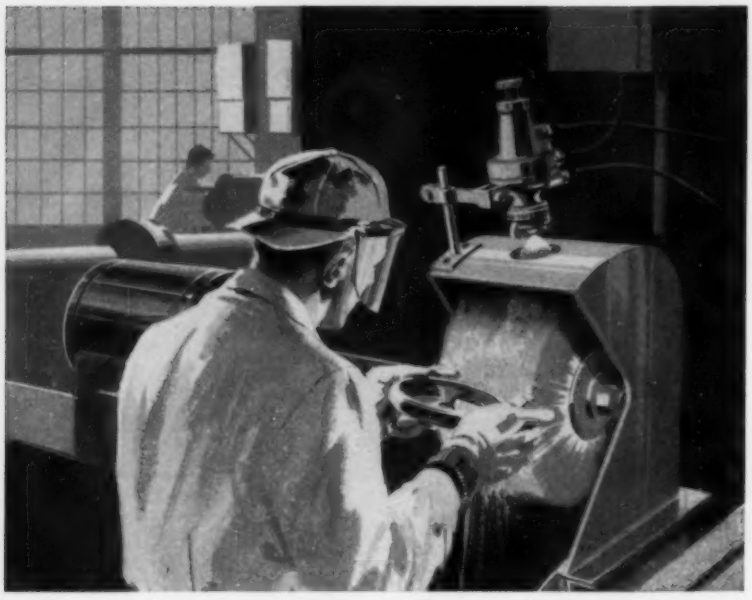

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The time your operator spends in manually compounding, handling polishing and buffing bars is saved for productive work when compounds are spray-applied. And the DeVilbiss spray method offers the most efficient way to keep wheels properly conditioned for faster, consistently high-quality work!

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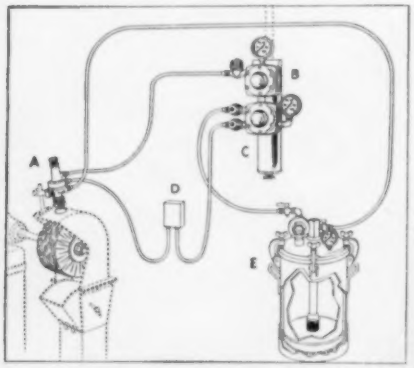
Call our nearest supplier for profit-saving information about DeVilbiss spray systems for polishing and buffing applications.



Complete DeVilbiss low-pressure "unit" system adapts to large or small manual or automatic installations. System includes (A) spray gun, (B) air transformer, (C) air regulator, (D) 3-way control valve, (E) pressure-feed tank, and hose.

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AIME MEETING . . .

treatment of phenolic wastes, marketing of coke by-products.

Blast furnace and coke oven: Ironmaking in the USSR, better utilization of coking coals, high-temperature testing of blast furnace coke, safety at the blast furnace.

Refractories: Progress reports on all-basic furnace at U.S. Steel's South Works; basic construction at Keystone Steel & Wire Co.; flat basic roofs at Jones & Laughlin Steel Corp., Laclede Steel Co. and Inland Steel Co.; and sprung basic roof at Republic Steel Corp.

Cold metal: Minimum iron charge, alloy steel production in a cold metal shop, mechanical aids to labor, advantages of an all-basic furnace in a cold metal shop.

Combustion: Trends in open hearth firing rates, jet atomization, bath temperature control and improved production rates, influence of combustion practice on heat transfer rates, automatic fuel control.

Physical chemistry: Significance of C. H. Herty Jr.'s work, open hearth slag control, producing steel to meet physical test requirements.

Wednesday, Apr. 10—An inspection trip to the Weirton, W. Va., plant of the Weirton Steel Co.

Hotel reservations should be made prior to Apr. 1.

The graph in the foreground is an electronic record of the ID of the 20-mm gun barrel. The inspector checks the OD at the same time with a standard dial indicator. The gage is made by Cleveland Instrument Co.

MEMO TO: *You*

YOU MIGHT AS WELL try to count the beans in a carload as the number of parts that are made of Roebling High Carbon Specialties, Flat Wire and Spring Steel. These Roebling products are unsurpassed for mechanical and dimensional uniformity . . . for speeding manufacturers' production and cutting costs.

Next time you order cold rolled high carbon wire or spring steel specify Roebling. Strictly on its performance you'll probably become a steady customer from then on. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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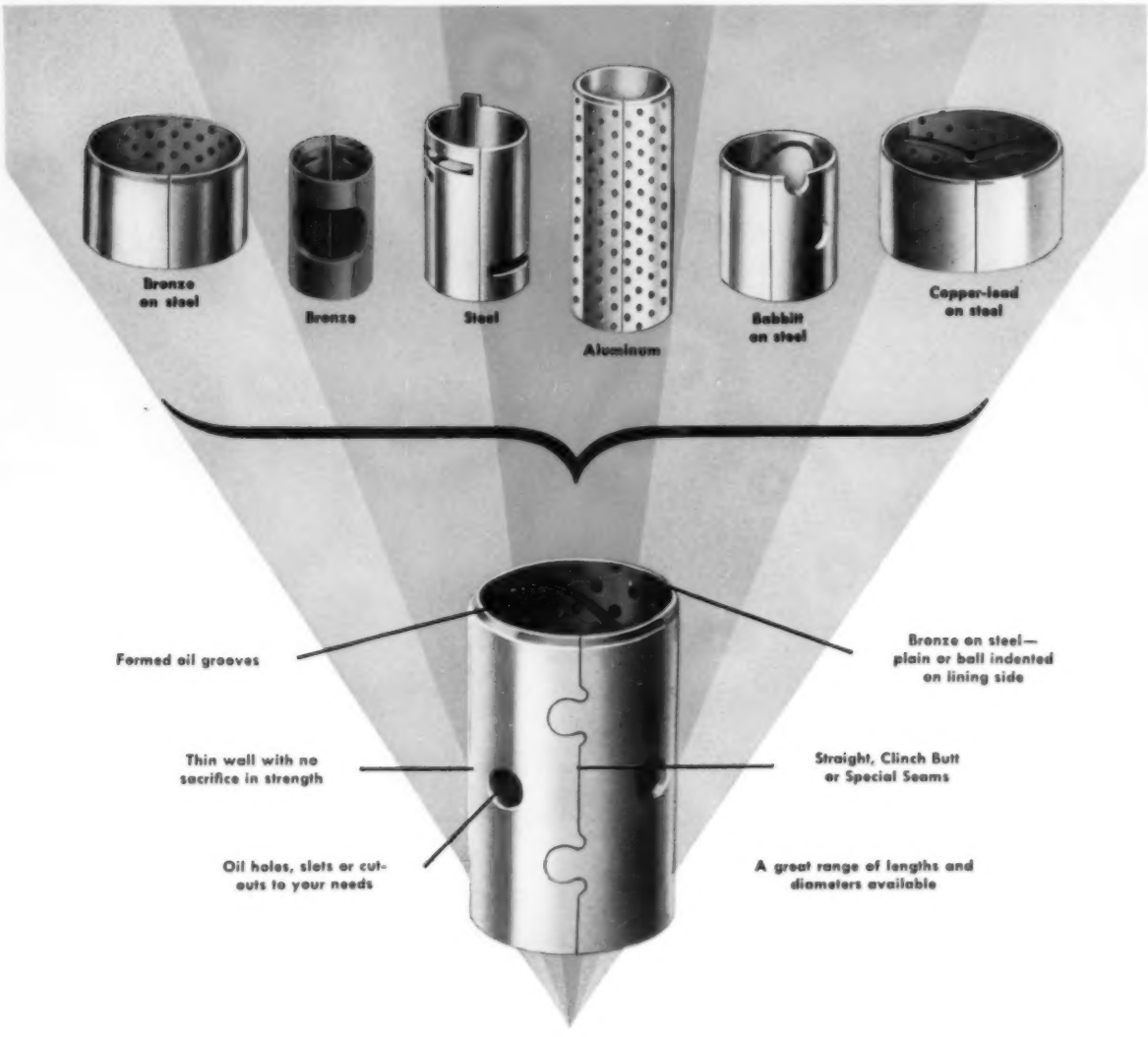
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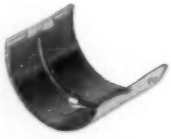

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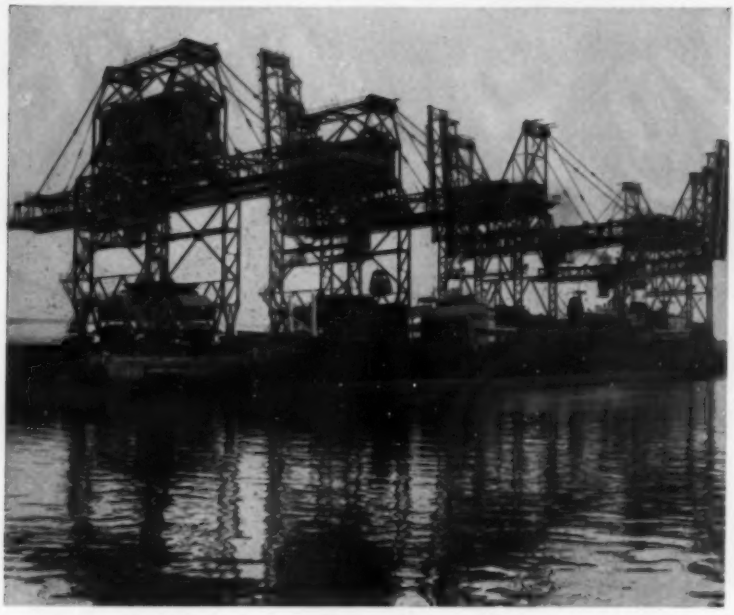
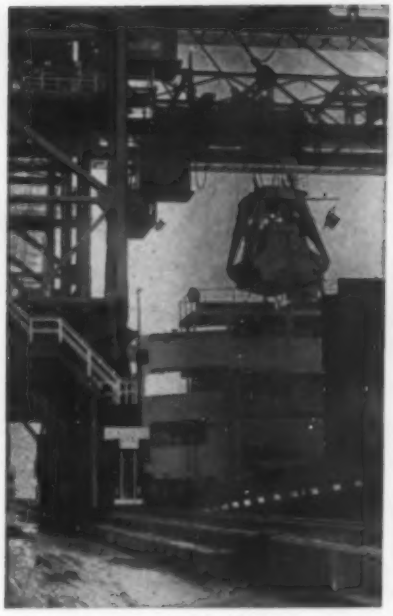


Latest ore unloader is shown at left. Bucket will reach out 73 ft from dock face; unloading cycle is 45 seconds



Bucket in action. Ship like one at right can be unloaded in a few hours

New Unloader Speeds Ore Transfer

A 22½-ton bucket with a free-digging capacity of 1800 net tons an hour handles a 20,000-ton ore boat in just under 7 hours. It's the latest addition at Greenwich Point, Philadelphia

THE increasing flow of foreign ores, particularly from Labrador and South America, has sparked the rapid expansion of pier facilities.

One of latest additions, the giant ore unloader shown above, has just started operating at the Pennsylvania Railroad's ore pier at Greenwich Point, Philadelphia. Its 22½-ton bucket can unload a 20,000-ton ship in just under 7 hours.

Capacity—The new unloader has a free-digging capacity of 1800 net tons an hour. The bucket can be overloaded to 25 tons. It takes about 45 seconds to move a bucket of ore from a ship's hold, although operators say they can occasionally cut that to 36 seconds.

Like the three other unloaders on the pier, the machine rides a track with a 64-ft gage. It is powered by 20 electric motors (10 to 800 hp) with a total of 2137 hp. An adjustable voltage control assures smooth operation of the bucket hoist and trolley travel.

Reach—The unloader can remove ore from the largest carriers. The bucket will reach out 73 ft from the dock face and can be lowered to 30 ft beneath the normal water level. A turntable on the trolley permits rotation of the bucket, facilitating easier removal of ore during cleanup operations.

High-speed electric motors rack the trolley along the bridge at 800 fpm. The unloader can travel 90 fpm.

The bucket empties the ore into a 2200 cu ft hopper which is mounted on travel trucks to serve two conveyors. The belts are 1600 ft long and carry the ore to the weighhouse and the railroad car loading station.

The unloader weighs almost 1300 tons. Two aprons, each weighing 104 tons, were assembled on the ground, loaded on barges and towed into place beside the main tower. A derrick boat lifted them into position.

Million Tons—The pier, which is operated for the railroad by the Pennsylvania Tidewater Dock Co., has grown into one of the largest of its type on the East Coast in the last 2½-years. Last July, it handled nearly a million tons of ore.

The unloader was built by the Dravo Corp., Pittsburgh.

Take a new

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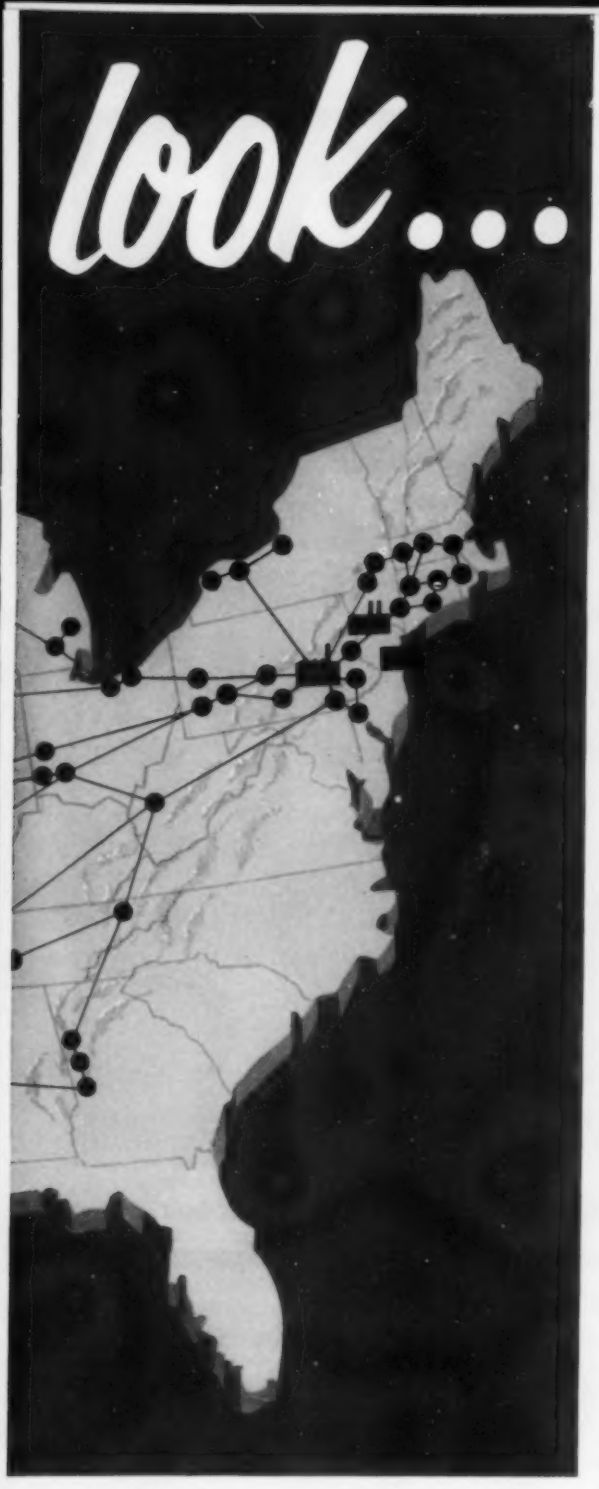

at where to get faster delivery and service on specialty steels

Wherever you are, there's a Carpenter Mill-Branch Service-Center in your area. Have you been in touch with us recently?

If not, we believe it will be worth your while to place a call today. Especially if you're looking for the kind of service and cooperation that can lead to new savings in your own use of specialty steels.

For example, look at your inventory from the standpoint of the manpower and paper work required to handle it . . . the valuable space it may be wasting . . . the dollars that may be tied up unnecessarily.

Carpenter's ability to meet your day-to-day specialty steel needs quickly, and without hesitation can do much to help you reduce a host of inventory problems. We're continually building our stocks of tool, stainless and alloy steels for fast delivery . . . to enable you to trim your own stocks to more profitable levels.

Important, too, is the cooperation you'll get from the folks at Carpenter. Whether it involves the order desk people — your Carpenter Representative, the warehouse crew or the office staff — they're all part of a team working for you. Their constant aim is to help you *hold down* specialty steel costs and improve your results.

For service that's backed by more dependable action . . . and delivery that's backed by a wider selection of specialty steel grades and sizes—call Carpenter, now. The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.

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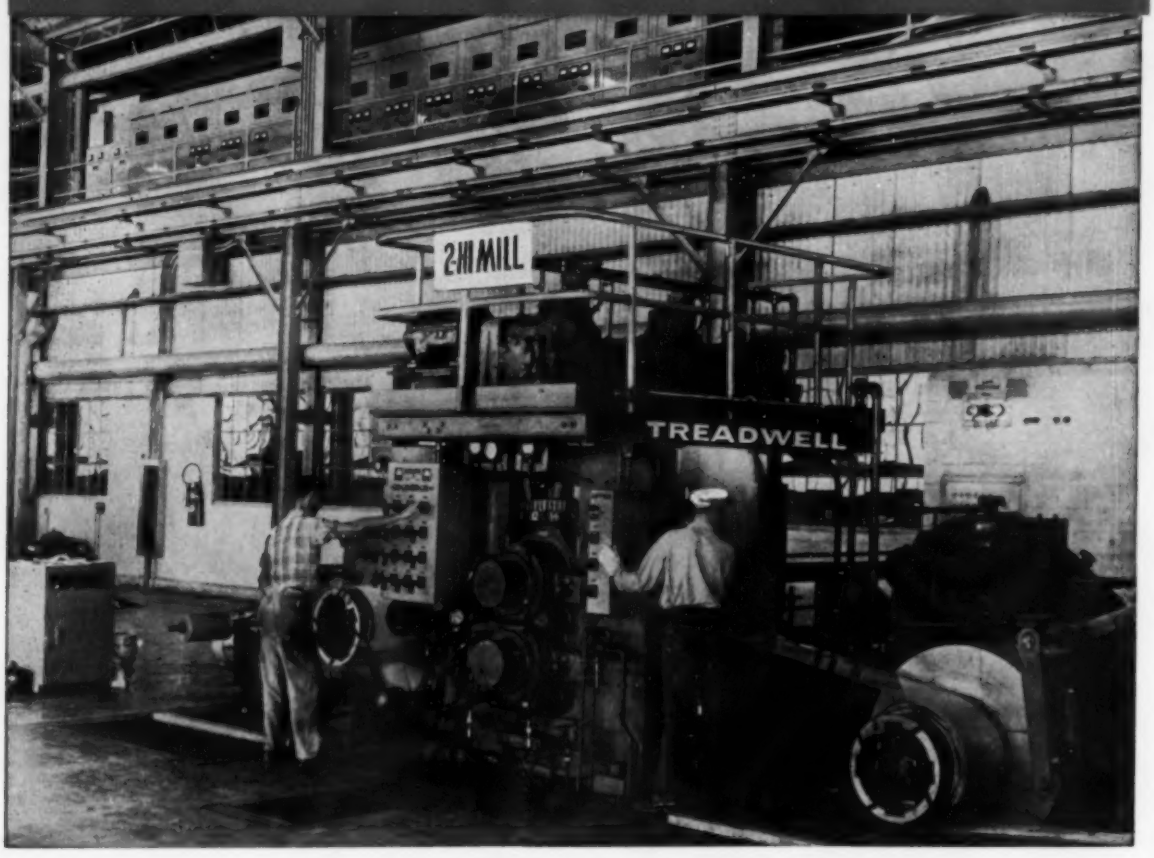

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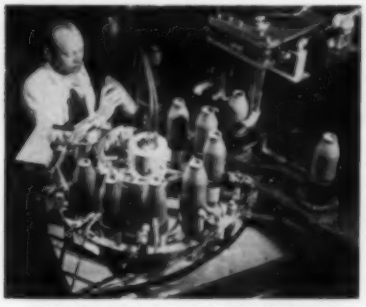
Rocket Inspector

X-rays and cadmium selenide crystals check the Army's 3.5 in. artillery rocket

A MACHINE has taken over the inspection of artillery rockets at the Cornhusker Ordnance plant, Grand Island, Nebr. It checks the explosive charge in each and automatically marks any that have defects.

Rockets are inspected on a circular platform. In the center is a 250,000-volt x-ray machine, which sends rays out to six inspection stations around the rim of the platform. Each station has a cadmium selenide crystal, which releases electrical current when excited by x-rays.



CONTINUOUS CONVEYOR
. . . brings rockets to test stations

All Over—The rocket moves up and down and rotates as it goes from one station to the next on the circular platform. X-rays strike a different part of the rocket at each station.

The quality of the explosive charge is indicated by the number of rays which pass through the rocket and strike the crystal. An excessive number causes it to release current to a digital computer.

Evaluates—The computer evaluates the seriousness of the defect. If it is critical, the computer actuates a mechanical arm which marks the spot where the defect is located.

The Robot X-Ray Inspector was built by the X-Ray Department of General Electric Co. Although the machine is designed to inspect 3.5 in. rockets, its principles and working parts can be readily adapted to machines that will automatically inspect many other types of ammunition, such as artillery shells, mortar shells, land mines and grenades.

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NO MORE WAITING days or weeks for new or rebuilt sling chains to reach you from the factory. Now, with all components furnished by your Herc-Alloy Distributor, you can assemble or rebuild your own Herc-Alloy slings in minutes.

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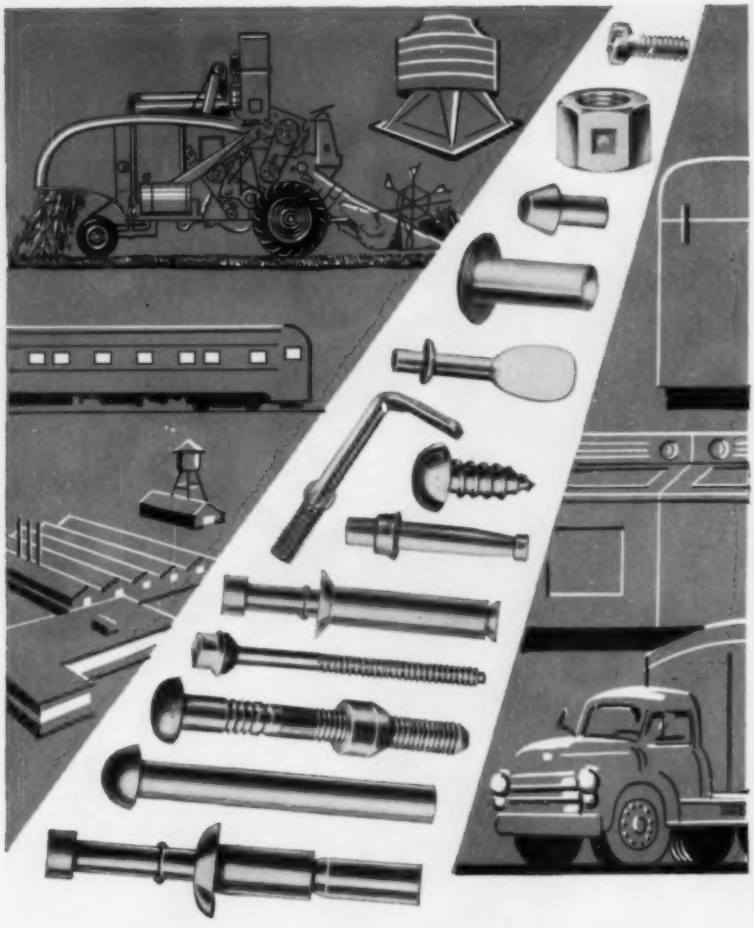

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Your products can be improved, and your manufacturing costs reduced, by using Townsend cold-formed fasteners and special parts. Townsend makes many types, and each is available in a variety of sizes and materials. Whatever your problem, there is a Townsend product which will provide a solution. If none of the thousands of standard items have the desired properties, a special part will be designed.

Cold-formed parts by Townsend are facilitating design improvements and reducing assembly costs in automotive, appliance, farm equipment, railroad rolling stock, and innumerable other manufacturing industries. In addition, they are providing low-cost, high-strength joints in all types of construction work. If you would like to learn what Townsend cold-formed fasteners and special parts can do to improve your products and production, write to Townsend Company, P.O. Box 237-C, New Brighton, Pennsylvania.

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Flow Coat Painting

By using a controlled flow and splash, this system paints parts evenly, rapidly

FLOW coating is being used to paint air conditioning and heating equipment at the Trane Co., La Crosse, Wis.

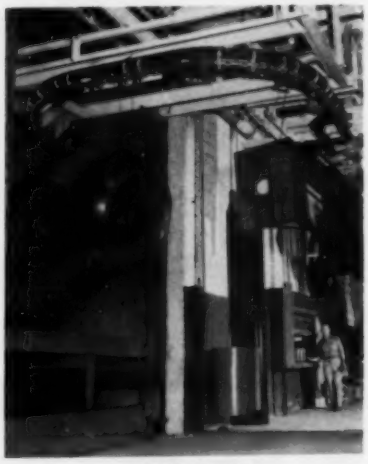
Here are some of the benefits claimed:

1. It has increased production 100 per cent.
2. It provides better protection for the metal. Paint is forced into crevices and hidden areas impossible to reach with other painting methods.
3. The coating is smoother, has fewer imperfections.

Splash—The paint line was installed by the Spra-Con Co., Chicago. It relies on a controlled splash and flow to reach the hard to get at spots.

Paint is pumped through a combination of rotating and fixed nozzles to flood all surfaces. Excess paint runs off into a sump for filtering and re-use.

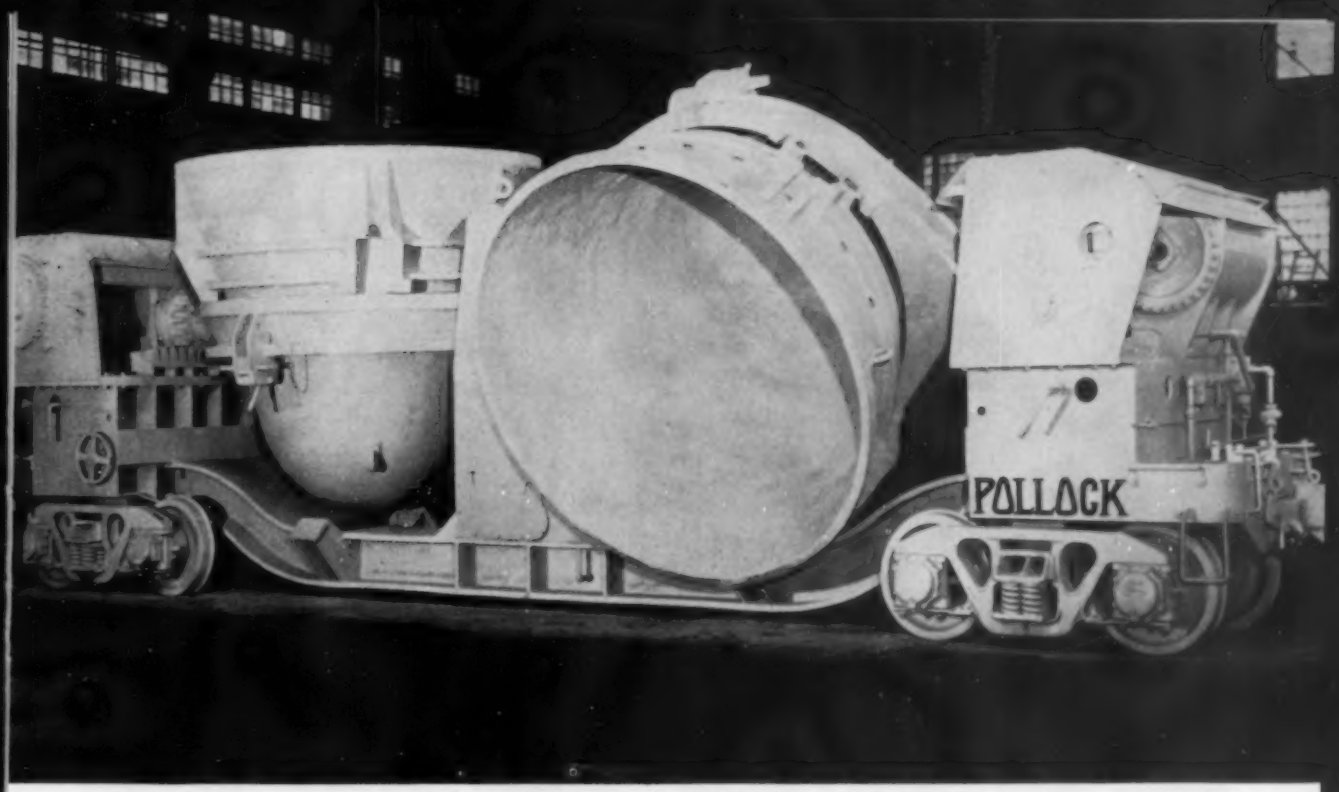
It is necessary to control the atmosphere to insure smooth flow.



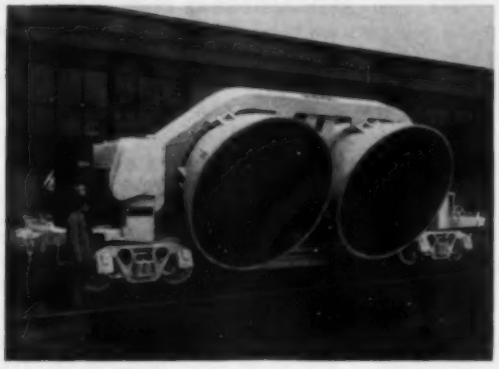
PUSHBUTTON
. . . starts flow coating system

Process—The first step is to give the parts a thorough cleaning and phosphate coating. Parts move through a drying oven and are cooled prior to coating.

After coating, the conveyor continues through a reinforcing booth into a drying oven. Temperature is maintained between 250 and 450°F.



Double pot, air operated Pollock slag car dumps to either side. Pots dump separately or together.



Pollock double pot, electrically operated car dumps pots simultaneously to either side.

Double pot, crane dumped slag car.

ONE OF THESE
DOUBLE POT SLAG CARS
IS RIGHT FOR YOU
DO YOU KNOW WHICH IT IS?

The type and size slag car you can use most efficiently and economically depends on three things: existing facilities, clearances and the use of the car. If you process slag, an electric dump gives you slow, even distribution. If you have a railroad crane or crane at the dump you can use the crane type. If you have adequate air capacity you will want the air operated cars, because they furnish the best means of dislodging skulls. The best way to select the proper car for your use is to consult the experts at The William B. Pollock Company. Most steel producers do. Pollock has built more slag cars, of all types, than anyone else in the world.

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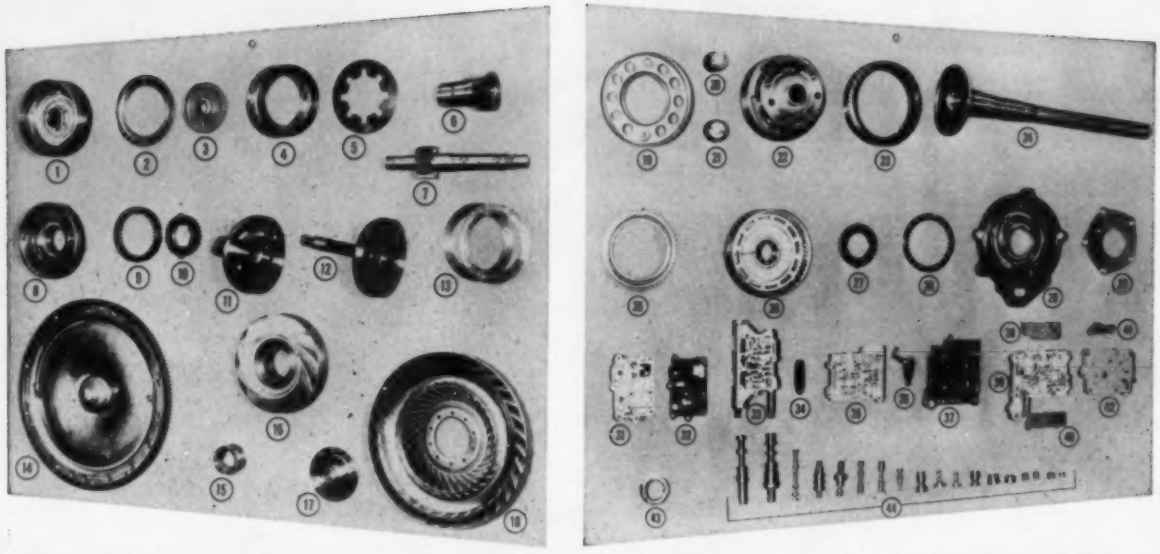


Photo 1—Automatic transmission parts that are finished by brushing. 1. Front clutch housing. 2. Front clutch pressure plate. 3. Front clutch hub. 4. Front clutch discs. 5. Pressure plate. 6. Secondary sun gear. 7. Primary sun gear. 8. Front oil pump body. 9. Front oil pump driven gear. 10. Front oil pump drive gear. 11. Converter stator support. 12. Input shaft. 13. Rear clutch discs. 14. Converter cover assembly (including stator ring gear). 15. Converter stator clutch inner race. 16. Converter stator. 17. Converter turbine hub. 18. Converter turbine and pump assembly. 19. Center support. 20. Long pinion gear. 21. Short pinion gear. 22. Planetary gear housing. 23. Internal ring gear. 24. Output shaft. 25. Rear clutch pressure plate. 26. Rear clutch housing. 27-28. Rear oil pump drive gears. 29. Rear oil pump body. 30. Rear oil pump cover plate. 31-33-35-39. Control valve bodies. 32-34-36-37-38-40-41-42. Make up control valve separator and cover plates. 43. Speedometer gear. 44. Control valves. Brush finishing of the various parts removes burrs, breaks edges and blends junctures

Brushes Solve Finishing Problems

By R. C. SASENA
Project Engineer
Osborn Mfg. Co.
Cleveland

Automotive partmakers find power brushing is a good way to remove burrs, break edges and blend junctures. Machines can be spotted in the production line

AUTOMATIC power brushing is a practical, economical solution to many of the finishing problems that tie up fast-moving production lines.

The automotive industry offers an outstanding example. Motorists want smoother and quieter operation; burrs and toolmarks must be removed from transmission parts and sharp edges must be broken. This is a job for brushing.

Motorists also want heavier bodies and higher horsepower engines which increase the possibility of part failure due to fatigue. Surface junctures must be blended to minimize areas of stress concentration. This is another job for brushing.

Transmissions — All the major automotive manufacturers are using brushing to produce precision finishes on automatic transmissions. Surfaces on many of these parts are in the 4 to 7 microinch range. From a finishing standpoint, transmission parts are similar to a large number of parts being machined in many plants.

Auto plants use special machines because they do so many brushing operations. One manufacturer of automatic transmissions spotted his power brushing machines in the production line and interconnected them with conveyors to carry parts to and from the machines.

Multiple Brushes — Most machines have multiple heads, each positioned so the brushes will reach the proper surfaces as the work advances through stations. The table rotates the work at a preset speed. Timers retract the brushes as the table moves the work to the next station.

The amount, direction and quality of brushing that each part receives depends on its type, metal and surface desired. The operator simply loads and unloads; all other operations are preset.

Ring Gear—Among parts that require deburring and finishing is a stator ring gear of 1046 steel. It's run on a 4-head, 6-spindle machine. Heads 1, 2 and 4 are set up with wire brushes made by Osborn Mfg. Co., Cleveland, to re-

move all burrs and blend the edges of the gear (photo 2). The wire brush on head 3 removes burrs from the peripheral edge of the teeth.

The four brushing heads approach the ring gear from preselected angles to insure complete cleaning. Spindles rotate the workpieces clockwise. The cycle takes about 1 minute from loading to unloading for each side of the gear. Conveyors carry the work to the brushing machine and away to the assembly station where the ring gear is fixed to the cover plate assembly.

The cover plate is brushed on a 4-head, 6-spindle rotary table machine. Heads 1, 2 and 4 are set to remove all burrs from the holes which are spaced around the outside diameter of the plate (photo 3). Head 3 is set to brush the shaft hole to break and blend the edge.

Brush Pressure—Proper brushing pressure must be maintained to get uniform finishing. On these machines, there is an ammeter for each wheel which indicates the current input to the motor that drives the brush.

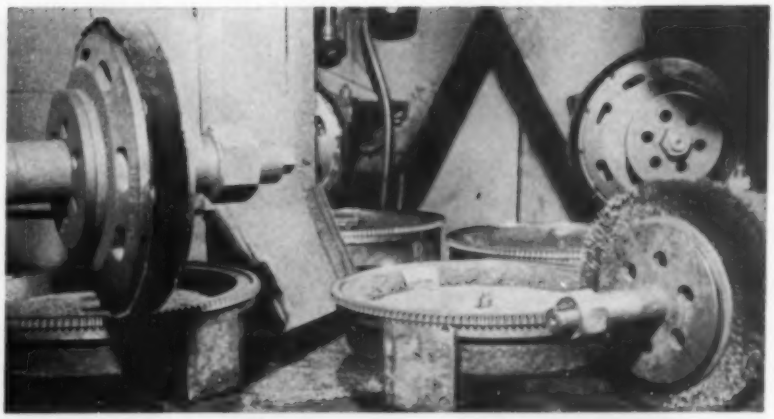
Brush pressure is kept uniform by holding a nearly constant mean current reading. Too low a reading indicates too little cutting; too high a reading means excessive cutting and unnecessary brush wear.

The rear oil pump body assembly is a cast iron part run on a 4-head automatic machine with a 6-spindle rotary table. Heads 2 and 4 are set up with narrow wire brushes to blend inner edges of the part which are crescent shaped. Heads 1 and 3 blend all sharp outside edges.

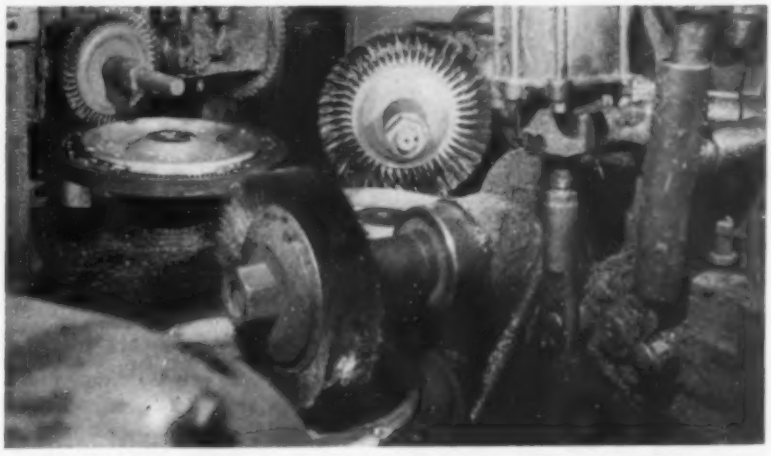
Removing Burrs — In another plant, fiber brushes are being used to remove burrs. Some applications are on steel shafts, and some are on aluminum valve parts.

The die-cast aluminum control valve bodies have complex coring and thin walls at right angles to the lapped faces which must make a tight fit to prevent leaks. Burrs where walls and faces meet may prevent good fits; if the burrs come free and get into the oil system, they may prevent sealing of the closely fitted control valves.

Two sets of Osborn fiber strip

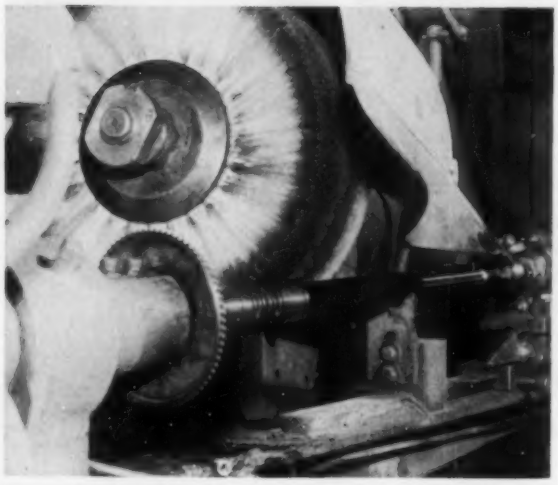


2—Automatic brushing machine removes burrs and blends edges on ring gear

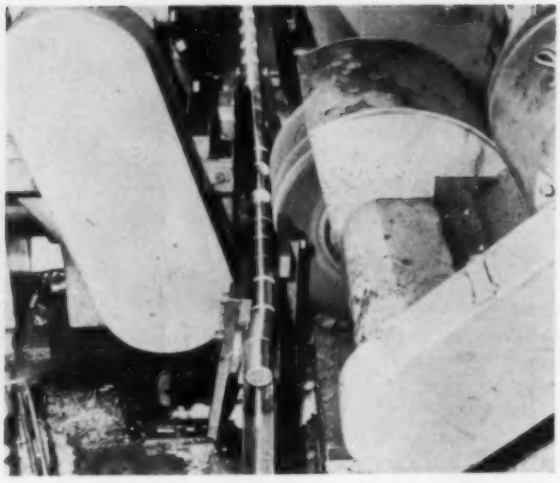


3—Three brushes remove burrs from the holes around the outside of this cover plate. Another brush breaks and blends the edges of the shaft hole

4—Narrow strip brushes set radially in two circular discs brush both faces of aluminum valve housings



5—Brushing machine has a fixture that reciprocates and rotates a driven shaft while a fiber brush slightly rounds the edges of ring grooves



6—A 12-in. brush, with 0.005 in. wire, finishes valve parts as they feed by gravity past the brush face. This is centerless brushing

brushes, set radially into each of two circular plates in the machine (photo 4), do the brushing on the two flat faces simultaneously. One set is above the castings and one below. The brushes are set in rotating discs.

Fixtures — The diecastings are set into holding fixtures that fit their contours loosely. The fixtures are rotated slowly by a chain that engages sprocket teeth on the fixture and are carried between the brush discs on a closed track that has semicircular ends.

The brushes move at all angles across the edges and enter slightly into the recesses between the two faces of the castings. Fine burrs are removed. The brushing cycle is kept short to prevent rounding the edges. No abrasive is used. The brushing cycle is 1½-seconds.

Steel Shaft—The output shaft (photo 5) is brushed at a point where several ring grooves are cut. Again, the outer edges of grooves have fine burrs that must be removed with only slight edge rounding if leaks around the rings are to be avoided.

This work is done in a special machine, with the shaft rotating at about 10 rpm and reciprocating slowly. Fiber brushes 12 in. in diameter and 3½-in. thick span the grooves and turn at 1750 rpm. For proper cutting action, the wheel is set so its axis makes an angle of 5 to 10 degrees with the shaft axis and at a distance where brush filaments are deflected about ¼-in. tangentially.

Compound—Occasionally, a burring compound is applied to the brush by hand. When loaded, a start button is pressed, and the fixture feeds into the wheel and reciprocates for about 12 seconds. A timer retracts the fixture.

In this case, the operator also tends a spline grinder from which he brings the shaft for brushing. The grinder cycle controls the number of shafts brushed—about 68 an hour. Edges of the grooves are broken about 0.008 to 0.010 in.

Internal Gears — In another plant, cast iron internal gears for the front pump of an automatic torque converter transmission are brushed. Because of the close fit on many parts and the use of hydraulic fluid that must be kept free of foreign matter, the surface of all parts must be free of burrs and perfectly clean. This is done by brushing with fine wire rotary brushes on two heads of an automatic machine.

The machined gears are set on vertical holders that are carried under the brushes by a slowly rotating dial. The part holders are separately rotated as they pass under the brushes to insure the uniform brushing of all teeth ends and the upper face of each gear.

Treated—Brushing is done before the gears are given a Parker Lubrite treatment and is repeated after treatment. The second brushing removes the Lubrite from the top face which does not require the treatment.

Brushes are 12 in. in diameter, ¾-in. wide and use 0.005 in. wire. They rotate at 1750 rpm in a direction that throws brushed off particles into suction scoops. About 1400 gears are brushed in an 8-hour shift.

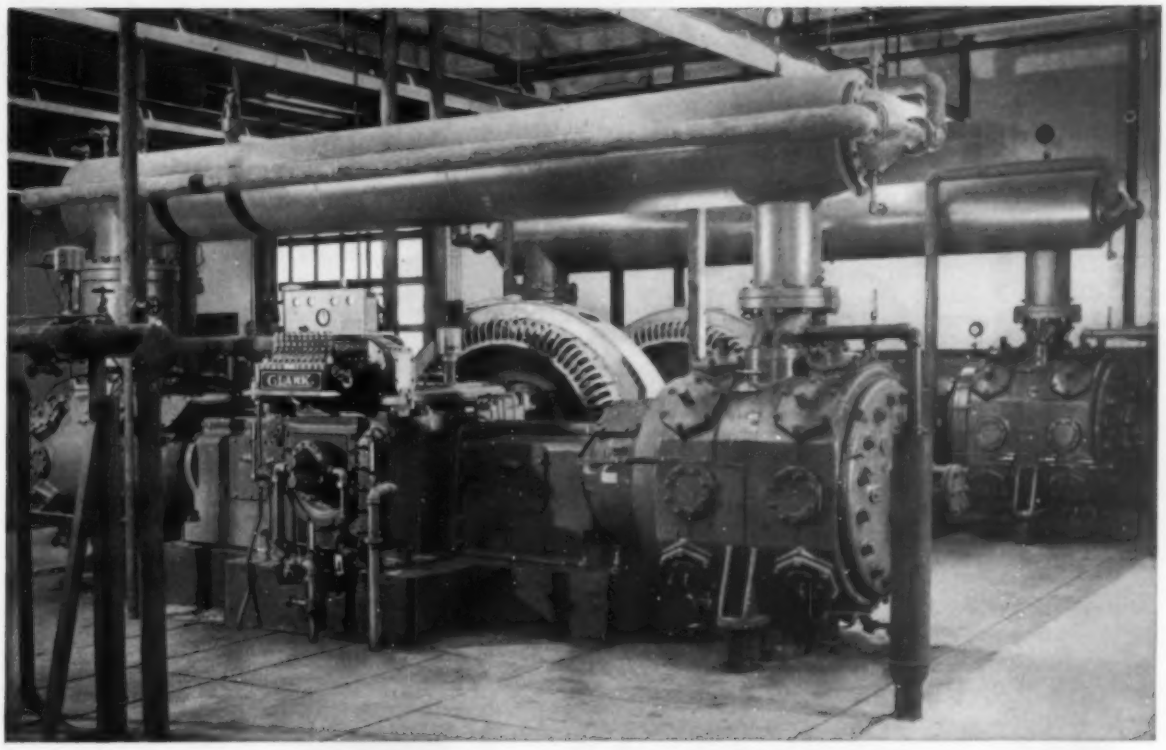
Centerless Brushing — Another manufacturer of automatic transmission parts is using centerless brushing to surface finish 27 different transmission control valve parts.

Production is 35,000 parts a day —most are small and cylindrical. The brushing machines use the principle of centerless grinding.

Gravity Feed—In one operation (photo 6), a 12-in. wire brush removes burrs on the edges of control valve lands which are produced in the final grinding operation. With brushing, the manufacturer is able to remove the grinding burrs and still maintain the size and shape of the valve lands to insure a quick acting control valve assembly.

Parts feed into a gravity chute. Regulating arms guide the parts past the brush face. They are free to rotate counter to the action of the brush.

The automotive industry has found that brushes and brushing methods are important production tools. They provide a good answer for manufacturing operations where the ratio of labor costs to other production costs is high.



What Jules Verne couldn't foresee!

Around the world, 24,325 miles of it, in 45 hours and 19 minutes... our strategic B-52 bombers did it non-stop! This speedy trip made Jules Verne's "80 days" seem like a lifetime. Part of the B-52 – the electrical pneumatic units that drive generators to provide the muscle for operating flaps, gun turrets, radar and countless other operations are provided by Thompson Products, Inc. of Cleveland, Ohio. Four of these 205 horsepower units go into every B-52. To be certain they are perfect, Thompson gives them a thorough test before shipment. One 350 horsepower Clark CMA-4 and two Clark 600 horsepower CRA-2 air compressors furnish the air for testing.

There is a vibrationless Clark balanced/opposed compressor for practically every requirement. Sizes range up to 6000 horsepower. Your nearest Clark representative has all the facts.

CLARK BROS. CO. OLEAN, NEW YORK
One of the Dresser Industries
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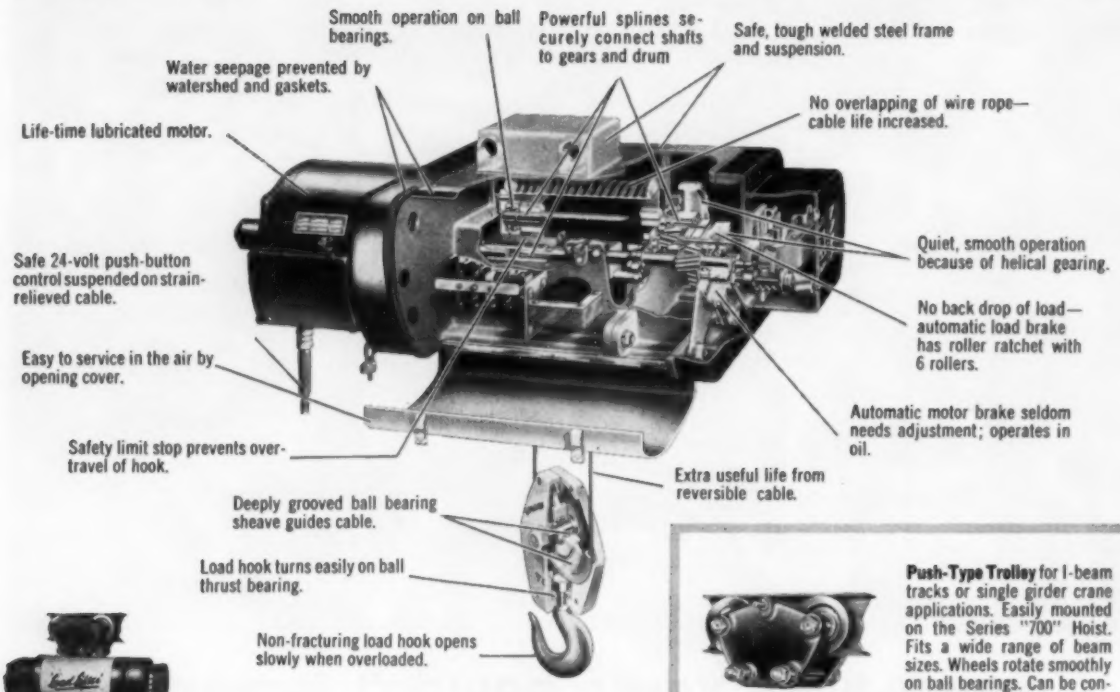
CLARK **Balanced/Opposed Compressors**

Here's Why the 'Load Lifter'® Stays on the Job

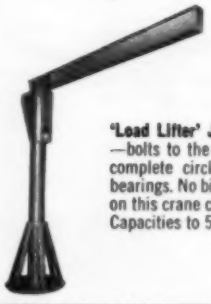

Smooth operation on ball bearings.
Powerful splines securely connect shafts to gears and drum
Safe, tough welded steel frame and suspension.
Water seepage prevented by watershed and gaskets.
No overlapping of wire rope—cable life increased.
Life-time lubricated motor.
Quiet, smooth operation because of helical gearing.
Safe 24-volt push-button control suspended on strain-relieved cable.
No back drop of load—automatic load brake has roller ratchet with 6 rollers.
Easy to service in the air by opening cover.
Automatic motor brake seldom needs adjustment; operates in oil.
Safety limit stop prevents over-travel of hook.
Extra useful life from reversible cable.
Deeply grooved ball bearing sheave guides cable.
Load hook turns easily on ball thrust bearing.
Non-fracturing load hook opens slowly when overloaded.

The Series "700" 'Load Lifter' Electric Hoist is built for heavy-duty service. Simple design reduces maintenance requirements. It is a low headroom hoist with high hook lift. It is fast. A ton can be lifted at 60 FPM speed. The two automatic brakes operate simultaneously. This means fast stops that permit precise spotting of loads. Each brake alone can hold the full load. Safety devices protect the operator, the load and the hoist itself. Ball bearings minimize frictional drag and power consumption.

The Series "700" 'Load Lifter' is demonstrating its superb performance every day in large and small plants. The same reliability, convenience and economy can be yours. Capacities: ½ to 15 tons. Where fragile loads must be handled, models with two speeds, one 3 times faster than the other, are commonly used. All types of suspension available: lug, push-type trolley, hand-geared trolley, and motor-driven trolley. **Check with your "Shaw-Box" Distributor for details or write us for Bulletin 410.**

Push-Type Trolley for I-beam tracks or single girder crane applications. Easily mounted on the Series "700" Hoist. Fits a wide range of beam sizes. Wheels rotate smoothly on ball bearings. Can be converted to a hand-geared trolley in the field.

Motor-Driven Trolley. Provides effortless hoist travel at the push of a button. Available for Series "700" 'Load Lifter' Hoists already in service. New hoists can be so equipped before shipment; no additional assembly required.



'Load Lifter' Jib Crane. Self supporting—bolts to the floor. Revolves through a complete circle. Swings easily on ball bearings. No binding. A 'Load Lifter' Hoist on this crane can serve a 550 sq. ft. area. Capacities to 5 tons.

57G-2

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter'® ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

384 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

Semiautomatic Honing Machine Adapts to Automation

Model 150 is a basic machine that has automatic stroking with stroking controls.

The maximum stroke is 12 in.; diameters up to 1½-in. can be handled.

The horizontal type machine has a stationary bridge to accommodate work fixtures and optional equipment. The design makes it easy to add automatic work handling devices and also simplifies changing from one job setup to another.

The spindle is mounted on a reciprocating carriage while the adjusting head is operated by hand.

Standard "package units" will partially or fully automate the machine.

The automatic feed package includes an automatic stone wear indicator and compensator.

Either a gage plug or ring is used in the automatic sizing package.

Automatic work handling brings the machine to full automation. A wide variety of work handling devices can be added.

The machine is cast in one piece to assure rigidity. It is 34 in. wide and 52 in. long. The table is 16 x 17 in. *Write*: Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich. *Phone*: Webster 3-7835

Band Mill Machines Large Blocks of Tough Die Steel

Model 26-5 can crop, slab and face large billets; reface or shank forging die blocks; split bearings; rip heavy plates and size large steel blocks.

It is designed to use the full capability of high speed steel saw blades which are 2 in. wide. Band velocities are 50 to 10,000 ipm. The throat of the band mill is 26 in.; the work thickness capacity is 18 in.

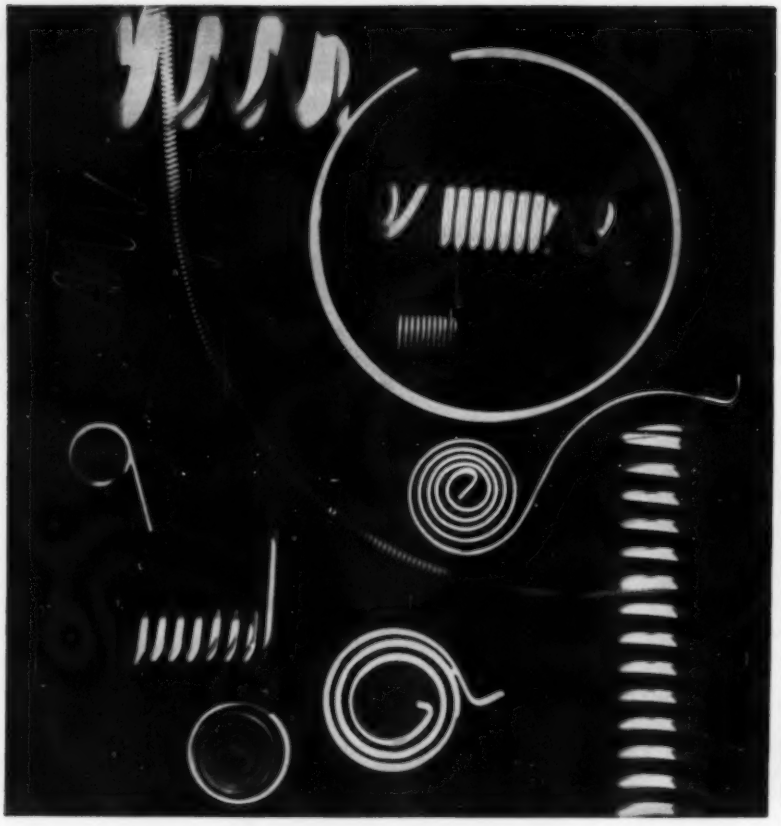
Hand scraped, force lubricated ways are used for the worktable because workpieces may weigh several tons and have to be moved freely and evenly.

Feed rates as low as 0.100 ipm are provided for large cross sections of tough materials. A fluid drive, ball screw feed is used to assure smooth, positive movement at the low feeding rates.

Nonproductive time is kept to a minimum by independent rapid traverse, hydraulic cylinders that provide fast forward travel and quick return of the worktable.

The rapid traverse is variable and can be used in feeding fast-cutting materials like aluminum. Maximum feed rate is 10 fpm.

A shroud coolant nozzle directs a heavy flow of coolant into the cutting area continuously during the cut. The recirculating coolant system provides for settling and filtering the coolant. *Write*: DoAll Co., 254 N. Laurel Ave., Des Plaines, Ill. *Phone*: Vanderbilt 4-1122



THOSE SPRINGS YOU'RE BUYING

Who says they meet the specs?

The manufacturer? Your Receiving Inspector? Or, maybe no one. Many springs, though carefully specified, are manufactured, shipped, and accepted *without being right*. That's because many spring users simply can't afford all the up-to-date testing equipment this would require.

All of Hunter's customers—large and small—receive *tested* springs. Without paying premium prices or extra charges, they have learned to demand evidence that the springs are *right*. Every order is tested and statistically recorded on a quality report, available to every customer with his shipment.

The quality report is not an "extra." No spring shipment should be considered complete without one. If you are not yet demanding tested springs, send for your copy of "The Quality Report and its Advantages," and learn about this new way of buying with assurance. Write for a copy of "Spring Buyer's Guide."

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19 Spring Avenue, Lansdale, Pa.

SPRINGS • STAMPINGS • TEST APPARATUS

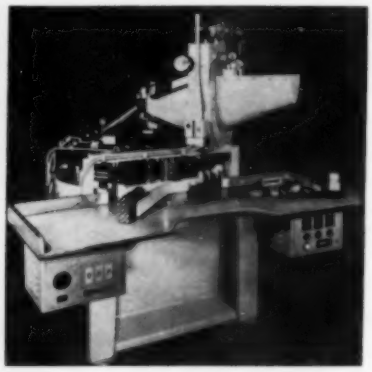
NEW PRODUCTS and equipment

Counter Fills Packages

Model 628 can fill 14 boxes with 100 parts in a minute.

The machine will put from 1 to 1000 screws, nails or other headed parts into cardboard boxes.

The operator places empty boxes on a continuously rotating turntable which carries them to the filling position, automatically releases each one and returns it to the operator.

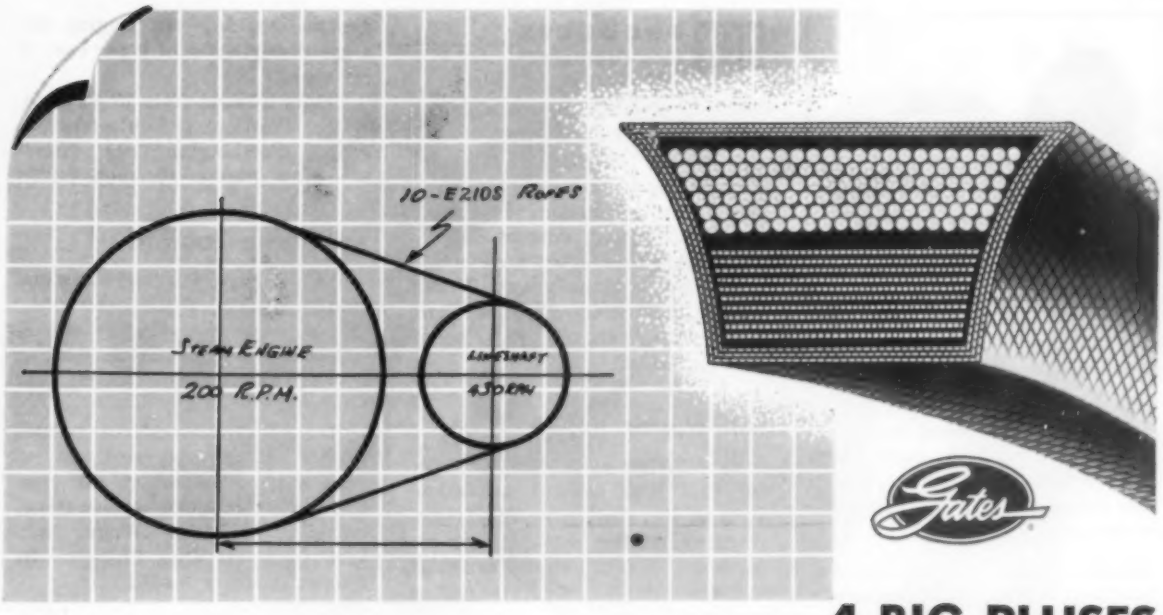


The machine slows down just before it reacnes the final count to permit an exact stoppage of flow.

Biggest part: Maximum length of screw shank is 3¾-in. Maximum shank diameter is ½-in. *Write*: Batchelder Engineering Co. Inc., 125 Main St., P.O. Box 159, Springfield, Vt. *Phone*: Turner 5-3101

Combination Welders

Two new Idealarc welders have capacities of 180 and 250 amperes. The machines operate equally well as an alternating current trans-



MORE HP DELIVERED PER $ INVESTED

On any new drive design—where you have limited space or you need to keep weight down—here is an important fact that can save you money:

A Gates Super Vulco Rope drive will deliver more horsepower per dollar invested than any standard V-belt drive.

Actually, the greater load carrying capacity of Super Vulco Ropes cuts down the number of belts required (5 Super Ropes do the work of 7 standard belts) . . . thus reducing the width of sheaves.

Sheaves with fewer grooves not only cost less, they weigh less, and take up less room—advantages that can easily improve the design and lower the overall cost.

A wealth of drive data is quickly available to you. Simply call your nearby Gates V-Belt Distributor (see 'phone book yellow pages) for a Gates V-Belt Specialist. Stocks available in industrial centers around the world. The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

4 BIG PLUSES

✚ *Handles shock loads*

Super-strength cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads.

✚ *Wears far longer*

Concave Sidewalls (Fig. 1) increase belt life. As belt bends, concave sidewalls (U.S. Pat. No. 1813698) become straight, make uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . longer V-belt life.

Flex-Weave cover (U. S. Pat. No. 2519590) provides greater flexibility with far less stress on fabric. Cover wears longer—increases belt life.

✚ *Provides Static Safety*

High electrical conductivity is built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

✚ *Resists oil, heat and weather*

Special rubber compounds with which cords and fabric are impregnated make Super Vulco Ropes highly resistant to heat, oil and prolonged exposure.

TPA 768

Gates Super VULCO ROPE Drives

A Job For A TWO-HEADED MONSTER

Wm. H. Lagee

PLANT SUPERINTENDENT, THE CINCINNATI GEAR CO.

Some of the men here look on me, I'm sure, as a modern Simon Legree with a nine-foot bullwhip — which isn't really a true picture at all. In fact, I think I'm pretty easy to get along with.

But there are times when I think this job of plant superintendent calls for someone with the attributes and physical characteristics of a two-headed monster. To keep track of a couple hundred different men, working on almost as many different jobs and different machines, all involving a high degree of skill and exacting accuracy, requires something more than mere attentiveness to duty. It means I have to constantly put forth an *extra* effort to do a top-notch job.

Not that I'm trying to brag about myself; my job is tough and sometimes it seems thankless, but it has its compensations. And one of the most important of these compensations is the satisfaction of knowing that my efforts are not being wasted. Because *everyone else* here is "putting out" to do *his* part too, with the result that we have a top-notch Company turning out a top-notch product — something that our customers have come to expect from us as a matter of course.

THE CINCINNATI GEAR CO.
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Fifty Years of "Gears—Good Gears Only"

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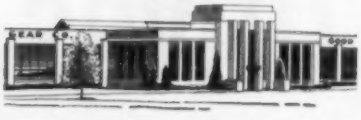


NEW PRODUCTS and equipment

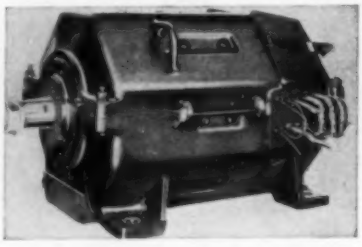
former-type welder or as a direct current rectifier-type unit.

A switch on the front panel changes the welder from alternating current operation to positive or negative direct current.

The machines operate on single phase, 230 volt, ac power. *Write*: Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, O. *Phone*: Ivanhoe 1-8100

Mill Motor

Type 620 mc is a heavy duty motor that uses silicone insulation. It has a cast steel, split type frame, integral bearing and housing assemblies, a large diameter shaft between bearing supports and a compact design.



Ratings: 275, 350 and 360 hp. *Write*: Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa. *Phone*: Valley 3-9191

Positioner Holds 1000 Lb

Model 10P positioner is for automatic welding which requires close speed regulation.

Load capacity is 1000 lb at 4 in. eccentricity and 4 in. center of gravity. Diameter of the table is 29. in. It has four radial T-slots.

A ⅓-hp variable speed drive has

dynamic braking and jogging and a speed regulation of 2 per cent of set speed.

Height adjusts from 27 to 42 in. *Write*: Positioning Equipment Division, Worthington Corp., Harrison, N. J. *Phone*: Humbolt 4-1234

Synthetic Coolant

Cool-Speed is for machining and grinding.

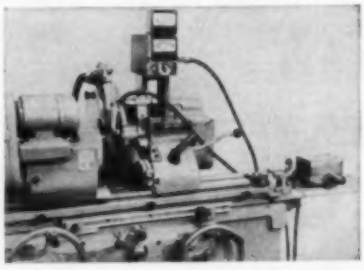
It is used with a water vehicle to produce a transparent solution which provides good cooling and lubricity.

The material does not become rancid. It prevents rust. It results in good finishes on cast iron, brass, aluminum and various steels, including stainless. *Write*: Daubert Chemical Co., Chicago, Ill. *Phone*: Andover 3-4342

Computer Controls Grinder

The LI-AP Autopairer automatically controls any grinder to produce external pieces to fit bores within the limits of desired radial play.

The need for match gaging or selecting fits is eliminated. The unit will hold accuracy to 0.000040 in.



Resetting for wheel wear and the need for the usual mechanical settings on a grinder are eliminated. Backlash is electronically compensated. *Write*: EAM Division, Industrial Gauges Corp., West Englewood, N. J. *Phone*: Teaneck 7-4350

Lathe Buffs and Polishes

The VRO is a heavy duty production machine which provides infinitely variable spindle speeds in the 1500 to 3000-rpm range. Turning a dial conveniently mounted on top of the machine changes the speed instantly.

A special braking bar can be used by the operator on either

bright idea

For enduring beauty that sells in a new car and
re-sells in a used car . . . design it, improve it and protect it
with McLOUTH STAINLESS STEEL.

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HIGH QUALITY SHEET AND STRIP

for automobiles

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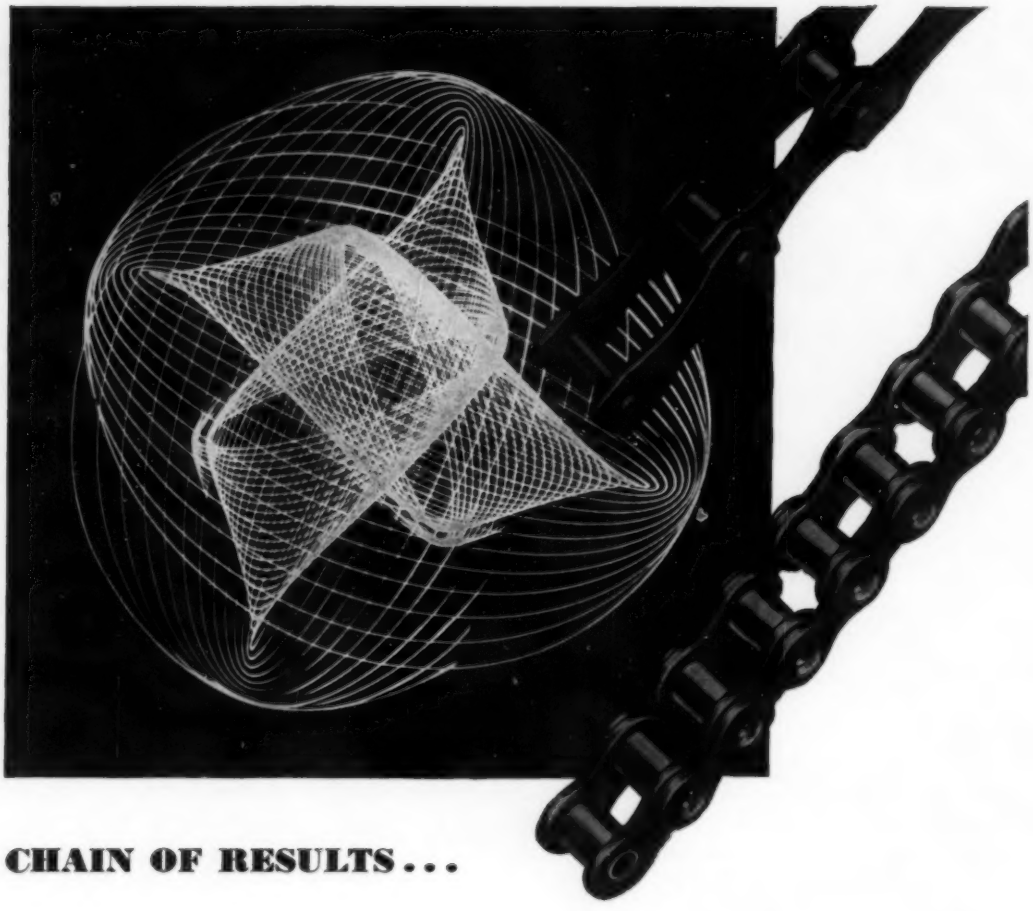
MANUFACTURERS OF STAINLESS AND CARBON STEELS



CHAIN OF RESULTS . . .

Whitney's Self-Lubricating Single and Double Pitch Roller Chain and "F-R" (fatigue resistant) Processed Roller Chain are design advancements that get results for machine manufacturers and users in many industries.

They should. For example, Self-Lube Roller Chain outlasts regular chain as much as 5 to 1 under rugged field conditions subject to extremes of dust or mud. In addition, they are widely used on processing equipment where cleanliness is vital and where external lubrication is not practical or desirable. Here, Whitney's exclusive sintered steel chain bushings "oil from the inside" . . . are prelubricated for life.

Whitney's exclusive "F-R" (fatigue resistant) Processed Roller Chain is establishing new service standards for durability, particularly on problem drives involving unusual operational conditions, stresses and heavy shock loads. This performance comes from the exclusive Whitney "F-R" process which offsets excessive operational stresses in the chain.

These new dynamic, balanced designs serve better, longer and at less over-all cost. And so does the entire Whitney line of A.S.A. Roller, Silent and Conveyor Chain Drives . . . all precision engineered for top quality.

Whitney Field Engineers provide nation-wide consultant service, backed up by company operated warehouses and alert Whitney Distributors offering a complete off-the-shelf stock service. If you want RESULTS specify WHITNEY CHAIN.

Whitney

CHAIN COMPANY

249 Hamilton St., Hartford 2, Conn.

ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

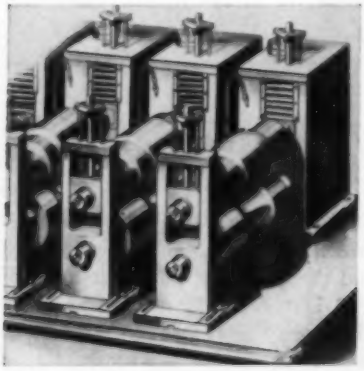
NEW PRODUCTS and equipment

side of the lathe. It can be operated from the sitting position. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. Phone: 5-7151

Rolling Mill

Interchangeable arbors are used by this rolling mill. Sizes vary from 1 to 3 in.

The change can be made in about 5 minutes by removing the outboard and taking out two screws on each arbor—a 14-head rolling mill takes about 140 minutes.



Mills are powered by 3-phase electric motors. *Write*: Mohawk Metal Forming & Tool Corp., 1330 Industrial Ave., Dearborn, Mich. *Phone*: Vinewood 1-0121

Elevating Conveyor

Short parts are elevated and fed automatically at any speed by the Special Model 4500.

The machine accepts rolling parts at a minimum height of 20 in. and elevates them up to 130 in.

Piston pins, tappet bodies and similar parts can be handled. The conveyor is equipped with a variable speed drive and has a timing

Specify *Michigan* Tubing for economy and versatility

The ABC of MST

A — Always Makes Possible
B — Better Products
C — At Lower Cost

A Quality Product

ROUND

⅛" to 4" O.D. 7 to 22 gauge

SQUARE	Gauge	RECTANGULAR
⅜" to ¾"	16 thru 22	⅜" minimum side to 5" maximum side
⅞" to 1"	11 thru 22	
1" to 2"	11 thru 20	
2" to 3"	11 thru 18	

Carbon 1010 to 1025

Standard Sizes

Tube Diameter O.D. Size	Maximum Wall Decimal	BWG Gauge	Minimum Wall Decimal	BWG Gauge
⅛	.065	16	.022	24
¼	.083	14	.022	24
½	.095	13	.022	24
⅝	.095	13	.022	24
¾	.095	13	.022	22
⅞	.095	13	.028	22
1	.095	13	.028	22
1⅛	.095	13	.028	22
1¼	.095	13	.035	20
1⅜	.095	11	.035	20
1½	.120	11	.035	20
1⅝	.120	11	.035	20
1¾	.120	7	.035	20
1⅞	.180	7	.035	20
2	.180	7	.035	20
2⅛	.180	7	.035	20
2¼	.180	7	.035	20
2⅜	.180	7	.035	20
2½	.180	7	.035	20
2⅝	.180	7	.035	20
2¾	.180	7	.035	19
2⅞	.180	7	.042	19
3	.180	7	.042	19
3⅛	.180	7	.042	19
3¼	.180	7	.042	18
3⅜	.180	7	.049	18
3½	.180	7	.049	18
3⅝	.180	7	.049	18
3¾	.180	7	.049	18
3⅞	.180	7		
4				

For 40 years

Michigan has been manufacturing tubular parts for leading manufacturers. This acceptance of Michigan tubing has been won by meticulous attention to customer requirements and the supplying of the very best in tubing. The following advantages of low cost manufacture and utmost dependability are yours when you specify Michigan for tubular parts in the fabrication of your products:

1. It is fabricated in round, square and rectangular shapes, in a wide range of sizes;
2. It is always of uniform strength, weight, ductility and weldability;
3. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted and rolled.
4. Complete facilities for the COLD DRAWING, ANNEALING and TESTING of tubing we manufacture.

Michigan STEEL TUBE PRODUCTS CO.

RESISTANCE WELDED STEEL TUBING — THE OLDEST NAME IN ELECTRIC

Consult Michigan

for engineering and technical help in the selection of tubing best suited to your needs.

40 Years in the Business

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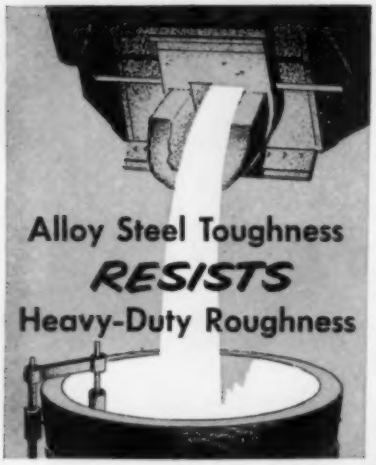


Landing-gear strut for the North American F-100C is manufactured by Bendix Products Division, Bendix Aviation Corporation. Exacting requirements for inner and outer cylinders resulted in the development of a new grade of steel by Bendix and Republic metallurgists working in cooperation with North American engineers.

How Metallurgical Teamwork Developed the Super Sabre's Tough,

When a new grade of steel is born, there's sure to be an interesting story behind it.

In this case, it's the story of close cooperation between metallurgical teams from Bendix and Republic. Their common goal: development of a tough, strong, alloy steel to withstand the shock, impact, strain and vibration of tons of aircraft hitting the runway at speeds in excess of 100 miles per hour.

It starts after World War II, when Bendix metallurgists undertook a program to correct certain characteristics and improve processing deficiencies of steels commonly used for aircraft landing gear.

Several leading steel companies, including Republic, were consulted and the program outlined. Republic immediately put its 3-Dimension Metallurgical Service Team on the problem.

The field metallurgist worked closely with Bendix metallurgists and engineers right in their own plant under actual operating conditions. Their findings were supplemented and coordinated by the other two members of the Republic team—the laboratory and mill metallurgists.

The result: development of a new grade of steel that

REPUBLIC

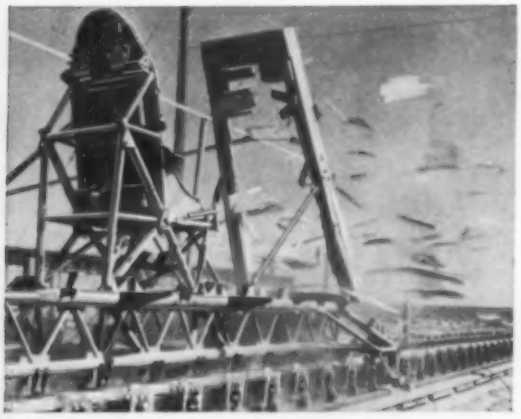
REPUBLIC STEEL

World's Widest Range of Standard Steels

Strong, Alloy Steel Landing Gear

was found ideal for application in the strength range of 220,000-240,000 psi. This steel, designated AMS 6427 by the SAE, offers maximum resistance to fatigue. Provides an exceptionally high strength-to-weight ratio. Maintains its great strength at wide temperature extremes. Responds uniformly to heat-treatment, producing hard, wear-resistant surfaces around tough cores.

Are you sure you are using the right steel? Why not make sure by using Republic's 3-D Metallurgical Service to assist you in a check-up? It's confidential. There's no obligation. Just send us the coupon.



WHERE STRENGTH IS AN IMPORTANT REQUIREMENT—such as this rocket sled for deceleration tests—manufacturers choose tubing for basic construction. At any given weight, tubing is strongest of all mechanical shapes . . . as a beam . . . in torsion . . . under compressive loads. Republic ELECTRUNITE® Steel Mechanical Tubing, the original electric resistance welded tube is well known for quality and performance. It's available in carbon and stainless steel in a wide variety of sizes, shapes and gages. Send coupon for more facts.

HIGH STRENGTH AND LIGHTWEIGHT ADVANTAGES of Republic Titanium are adding range, speed and maneuverability to both military and commercial aircraft. In the Navy's HOK-1, sections fabricated from Republic Titanium, Type RS-70 Annealed are used as the firewall between pilot and engine compartments. But, titanium should not be looked upon as strictly an aircraft or military metal. Its extremely high resistance to most forms of corrosion makes it attractive for use in processing and chemical equipment, heat exchangers, dehydration trays, anodizing racks, etc. Mail coupon for more information.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-2828
3120 East 45th Street, Cleveland 27, Ohio

☐ Have an Alloy Metallurgist call.

Send more information on:
☐ ELECTRUNITE Mechanical Tubing ☐ Titanium

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Company_____

Address_____

City_____ Zone____ State_____

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Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .

PETERSON STEELS, INC.
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Detroit, Michigan Chicago, Illinois

NEW PRODUCTS and equipment

take-off from the cam mounted on the lower shaft.

Power is furnished by a ¼-hp motor. *Write*: Feedall Inc., P. O. Box 47, Willoughby, O. *Phone*: Willoughby 2-8100

Fork Truck Lifts 4000 Lb

Model 430-G is a gasoline-powered truck which has a lifting suspension that eliminates destructive side forces on ram and cylinder when handling off-center loads.

One pivotally mounted double acting cylinder controls the tilting action.

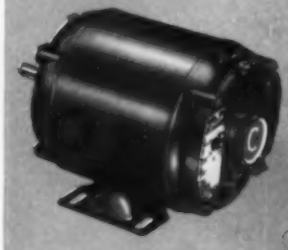
The operator can get into the

CENTURY HAS THE COMPLETE LINE . . .

Big as 400 H.P.

125 H.P. Type SC

small as 1/20 H.P.



WHATEVER YOUR APPLICATION THERE'S A Century MOTOR

Performance-Rated© to do the job

You'll get the top performance your equipment's designed for . . . because there's a motor *designed for it* in the Performance-Rated Century line.

Century's technique of Performance-Rating enables you to choose motors with the right size, speed, frame, and torque characteristics to fit—*exactly*—your application requirements.

You can select from a range of 400 to 1/20 h.p.; AC single or polyphase, or DC; drip proof, dust proof, or explosion proof frames. There are optional corrosion-resistant features; constant speed, multi-speed, varying or geared speeds.

Let us prove the value of Performance-Rating for you . . . without obligation. Call or write your nearby Century District Sales Office or Authorized Distributor.

Performance-Rated© MOTORS 1/20 to 400 H.P.

CENTURY ELECTRIC COMPANY

1806 Pine Street • St. Louis 3, Missouri • *Offices and Stock Points in Principal Cities*

Vibration won't loosen FLEXLOC self-locking nuts

Where products must be reliable . . . must stand up under vibration, temperature extremes and hard use . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting locking action. And they are reusable: repeated removal and replacement, frequent adjustments, even rough screw threads will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes, types and materials to meet the most critical locknut requirements. Your local industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

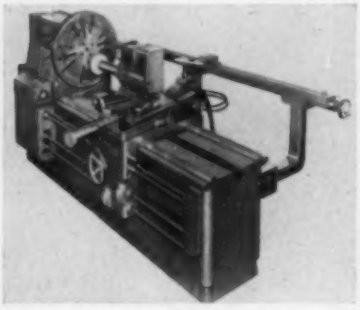
JENKINTOWN PENNSYLVANIA

truck from either side. An engine-hour meter is an aid to regularly scheduled servicing. *Write*: Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill. *Phone*: Yards 7-2515

Contour Grinder

Intricate internal and external contours are ground automatically by this machine.

It's equipped with standard flat wheels dressed to simple radiuses. A single pivoting unit provides three angularity adjustments.

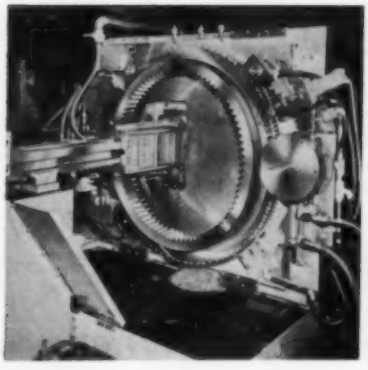


Spindle speeds of the work head range from 0 to 220 rpm. Speed of the grinder head is 3450 rpm. *Write*: Industrial Tool Engineering Co., 13849 Keal, Detroit 27, Mich. *Phone*: Texas 4-1880

Broacher Does Big Jobs

This universal horizontal machine has a 90-in. stroke. It broaches finished spur or semifinished helical gears up to 42 in. pitch diameter.

The gear is clamped to the face plate which also holds the master indexing gear. A pin against a gear tooth pawl actuates the auto-



TOOL STEEL BY THE BAG?

Yes sir, 525 million pieces of round, solid, tough machine tool steel in one 50 pound bag of TRU-STEEL SHOT (S-70 size)!

TRU-STEEL is the original high carbon, fully heat-treated steel shot of tool steel quality!

If your cleaning operation has "machine tool" requirements — if you're doing peening, descaling of sheet or plate, or continuous cleaning of castings or other materials where you need a steel shot that is round, solid, and tough, uniformly from one shipment to the next, you'll want TRU-STEEL.

TRU-STEEL is TRUE STEEL

Write for full information on what TRU-STEEL can do for YOU in YOUR cleaning operation!

TRU-STEEL SHOT

STEEL SHOT PRODUCERS, INC. ®
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold by Pangborn Corporation, and by leading distributors of foundry supplies from coast to coast

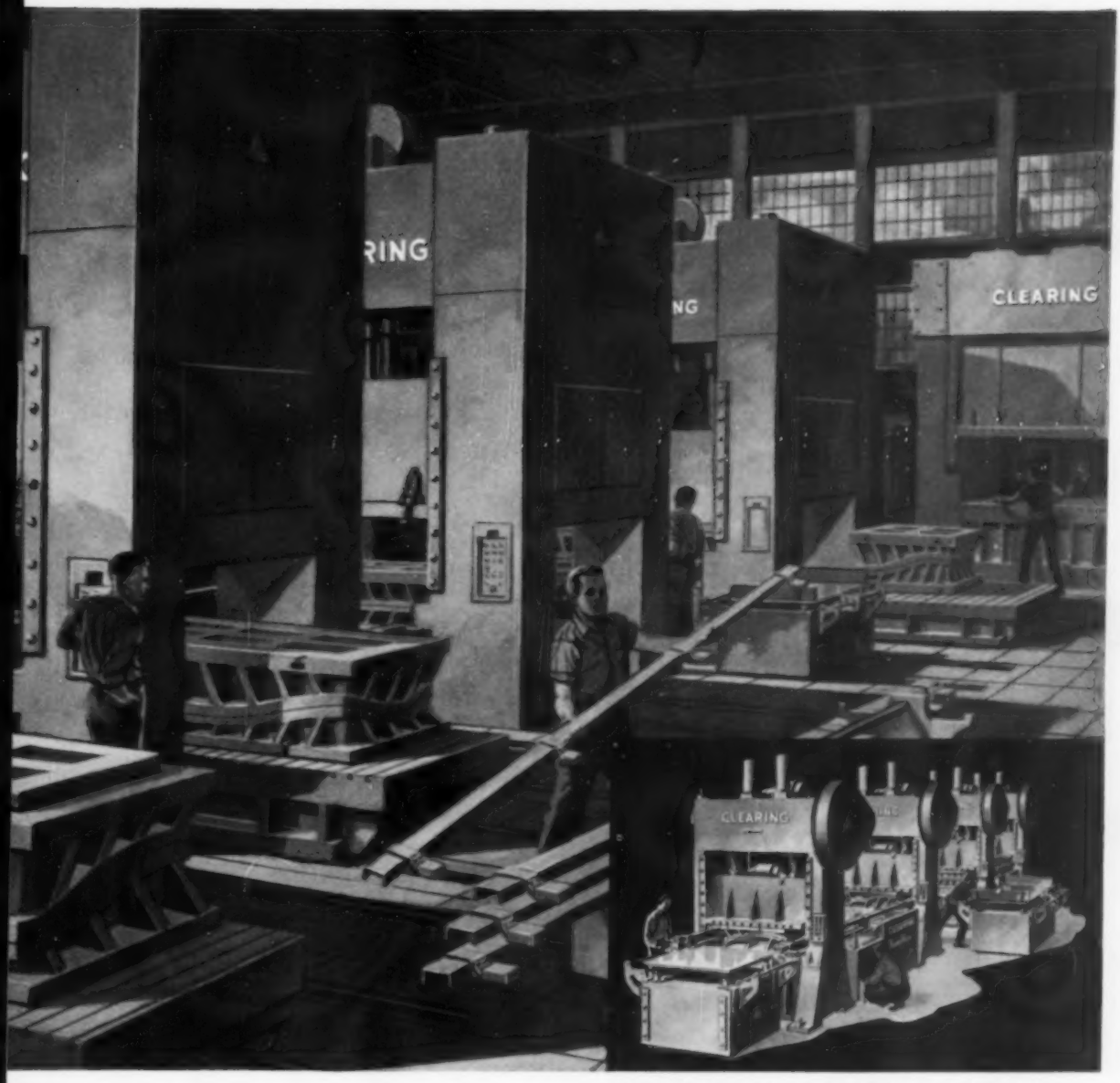
The Impossible doesn't take as long

Impossible to convert an automated transfer-feed line? Not even difficult when it's a Clearing Transflex line. In fact, the whole automated setup can be converted from producing one part to another *in about half an hour.* The Clearing automated line above is equipped with a feed where the fingers on the feed bars can be adjusted, or faster still, replaced with a different set of bars pre-set for the next job. The presses also have moving bolsters. Dies for the next run are set up outside the press while the presses are operating. When the run is completed, the new dies are powered into place at the touch of a button.

Think of it! An entire automated line ready to go on the next production run in about 30 minutes. That's not all. These presses are equipped

CLEARING PRESSES

CLEARING MACHINE CORPORATION *Division of U. S. INDUSTRIES, Inc.*



One modification of the Transflex line shown in the large illustration offers the benefits of automated production at a relatively moderate cost. This line has the same basic removable feed mechanism as shown above adapted to medium capacity machines. Feeds may be wheeled anywhere in the shop to automate other press lines.

as you might think!

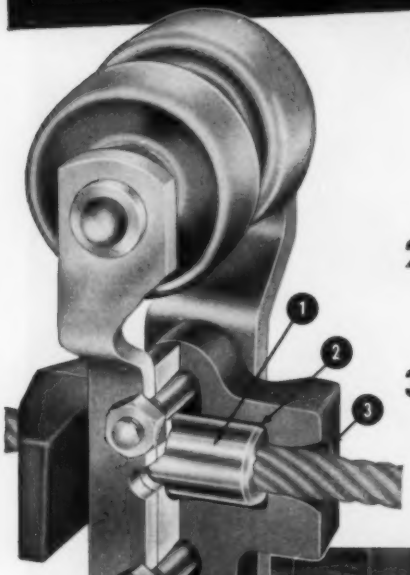
with removable feed units. Consequently, part of the press line can be operated manually by simply rolling the feed units—they're on wheels—to one side. The last press in the line shown above is on manual operation. The first three are being readied for an automated, hands-off setup. Yes, the impossible is standard operating procedure with a Clearing Transflex line.

Here then is automation so flexible that even a job stamping shop with requirements for many different parts can plan to automate some of its stamping production. There are many different Transflex ideas that Clearing engineers can discuss with you. Get in touch with us. There'll be no obligation.

THE WAY TO EFFICIENT MASS PRODUCTION

6499 W. 65th Street • Chicago 38, Illinois • Hamilton Plant, Hamilton, Ohio

NOW BUSH-LOCK design The No. 1 Choice in Overhead Cable Conveyors



1. ***BUSH-LOCK, the heart of this truly "Universal" Cable Conveyor***

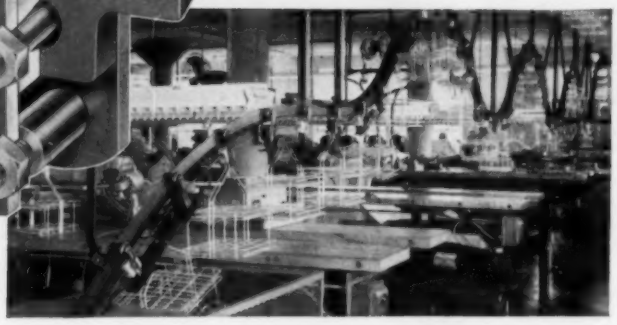
Cylindrical bushing permanently locked to preformed cable on accurate immovable centers by high-pressure swaging.

2. ***Rotary Floating Action***

Trolley castings bolted around BUSH-LOCK assure true alignment of trolley to track.

3. ***Bell shaped for longer cable life***

Castings allow cable to flex in all directions with smooth arc support.



A typical Buschman Cable Conveyor . . . carries light to medium weight loads through all operations at convenient heights.

Bush-Lock Cable in 100′ lengths provides a continuous power element with practically no points of wear. Stock track, drives, idlers and vertical curves are easily installed into a durable, efficient, low cost system.

Why not get all the facts how to produce more at less cost with compact, smoothly-operating Buschman conveyors.

Write for literature today.

PRODUCE MORE . . . FOR LESS
Buschman
CONVEYORS

C-333-EWB

THE E. W. BUSCHMAN COMPANY
4496 Clifton Avenue, Cincinnati 32, Ohio

NEW PRODUCTS and equipment

matic shuttle and automatic indexing.

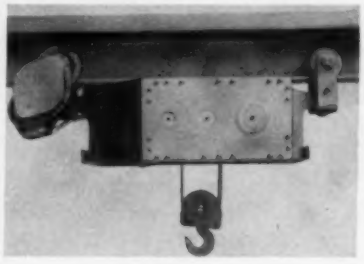
Gears are broached in two passes. A special angle plate bolted to the machine face is used for semifinishing the helical gears.

The machine's hydraulic system has a 40 per cent safety margin above the machine's capacity. This minimizes shock, reduces vibration and provides reserve power when needed. *Write*: Colonial Broach & Machine Co., P.O. Box 37, Harper Station, Detroit 13, Mich. *Phone*: Jefferson 6-2550

Hoists Are Precise

This line can control load positioning to 0.008 in. Capacities are 3 to 15 tons.

A trolley mounted hoist of 7½-ton capacity measures only 21 in. between the rail and the load carrying eye of the hook. The low headroom is achieved by a flat-laying U-shape arrangement of the motor, gearbox and drum.



The motor and drum are parallel and mounted in the same side of the gearbox. The load block retracts between them.

Regenerative braking automatically regulates load travel to controllable speeds. Load control is provided by instant torque of the motor and the use of two braking systems. *Write*: R. G. LeTourneau Inc., 2399 S. MacArthur, Longview, Tex. *Phone*: Plaza 3-4411

Straightens Extrusions

This 25-ton hydraulic stretching and detwisting machine finishes extruded aluminum alloys.

A tube, bar or structural shape 6 to 100 ft or more long which can be enclosed in a circle 8 in. in diam-

J&L cold drawn ELECTRICWELD tubing with a superior SPECIAL SMOOTH I.D. finish

Cold drawn ELECTRICWELD tubing with the superior smooth I.D. finish will cut your production costs in applications like these:

- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like surface finish helps reduce or eliminate costly machining on many applications. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

ELECTRICWELD tubing withstands high internal hydrostatic pressures; carries heavy torsion loads; resists high-frequency vibration. It offers a favorable weight-to-strength ratio where loading occurs in all directions.

It is furnished in OD sizes from ½ inch to 2⅞ inches and in wall thickness from 20 to 10 gauge, 0.035 and 0.134 inch. Send coupon today for complete information.

Jones & Laughlin Steel Corporation
Dept. 404, 3 Gateway Center
Pittsburgh 30, Pennsylvania

Send me a copy of your cold drawn ELECTRICWELD tubing booklet.

Name_____

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Company_____

Address_____

City_____ Zone___ State____

J&L STEEL

Jones & Laughlin

. . . a great name in steel

19 tons of stainless...

all for one customer...

all for atomic power...

Type 304 stainless plates abrasive cut to size and ultra-sonic tested. These plates total 19 tons and range from 1 to 6 inches thick.

J&L cold drawn ELECTRICWELD tubing with a superior SPECIAL SMOOTH I.D. finish

Cold drawn ELECTRICWELD tubing with the superior smooth I.D. finish will cut your production costs in applications like these:

- **cylinder tubing**
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Dept. 404, 3 Gateway Center
Pittsburgh 30, Pennsylvania

Send me a copy of your cold drawn ELECTRICWELD tubing booklet.

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J&L STEEL

Jones & Laughlin

. . . a great name in steel

eter can be stretch-straightened at high speeds.

Jaws in the headstock and tailstock are positioned vertically for a fast horizontal material pass line. Localized detwisting can be done because there is a clear passage through the detwisting head for the extrusion.

The headstock can be turned an infinite number of rotations for removing twist while the extruded section is being stretched.

Automatic zeroing control returns the headstock to its zero

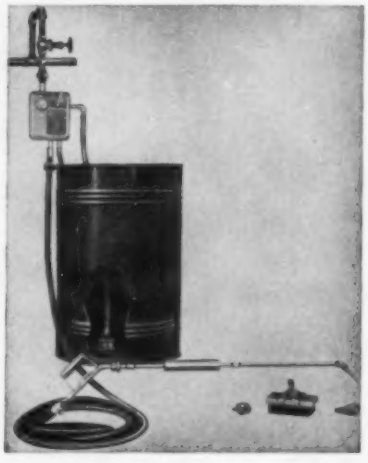
position after the detwisting operation. *Write*: Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa. *Phone*: Grant 1-8077

Steam Cleaner

The Steamerette is an injector unit that uses existing steam supplies for steam cleaning, paint stripping, phosphating and sanitizing.

The unit will operate in the 40 to 140 psi range. A built-in pressure gage indicates operating pressure, eliminates fluctuating and assures uniform cleaning.

Quantity and pressure of the solution at the nozzle may be varied to provide every type of delivery—

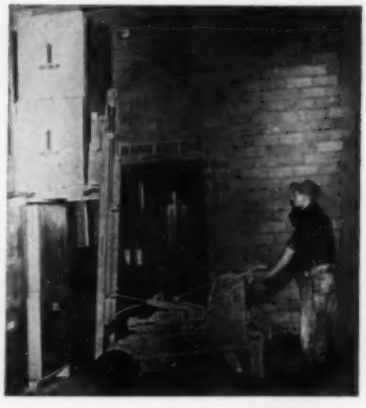


from a slow full stream at moderate temperature to a hot driving blast. *Write*: Turco Products Inc., 6135 S. Central Ave., Los Angeles 1, Calif. *Phone*: Adams 2-6111

Fork Truck

This truck weighs 1050 lb and will lift 1000 lb 6½-ft in 6½-seconds. It will climb a 20 per cent grade with a full load. Lifting capacity depends upon the load center.

The unit is 31¼-in. wide and



Now! Ajax SALT BATH FURNACES with REMOVABLE SUBMERGED ELECTRODES

What used to be a costly, time-consuming job now takes only an hour or two at the most. Labor cost is next to nothing . . . and there is little or no "down time" for the heat treating equipment because Ajax Removable Submerged Electrodes can now be changed without tearing down either the furnace wall or the pot.

Electrodes enter from over the top and slant into the salt bath. *There are no openings below the salt line.* A ceramic tile over each pair of electrodes seals off all air and eliminates corrosion at the salt line. *Thus, all the inherent advantages of submerged design are assured.*

To expose the electrodes for rapid removal, it is only necessary to lift the tile. The entire job can be handled by unskilled labor. Actual electrode changing time is less than an hour per pair.

Write for Bulletin 810 giving full details.

REPLACE AJAX REMOVABLE SUBMERGED ELECTRODES

. . . at absolute minimum labor cost
. . . without costly shutdowns
. . . without tearing down either furnace or pot

NOTE TO AJAX USERS! For as little as one fourth the cost of a new furnace, old Ajax Submerged Electrode Furnaces can be changed to this new removable electrode design.

AJAX ELECTRIC COMPANY
952 Frankford Ave., Philadelphia 23, Pa.
Associates: Ajax Engineering Corp.; Ajax Electrothermic Corp.

Three Rust-Oleum DIFFERENCES that save you time, money and metal!

GOES ON FASTER

No tedious surface preparations usually required — just scrape and wirebrush to remove rust scale and loose rust — then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust.

STOPS RUST

Rust-Oleum's *specially-processed* fish oil vehicle works down through the rust into the tiny, microscopic pits in the bare metal where it drives out air and moisture to *stop rust.*

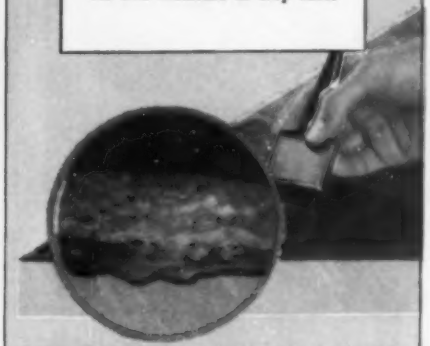
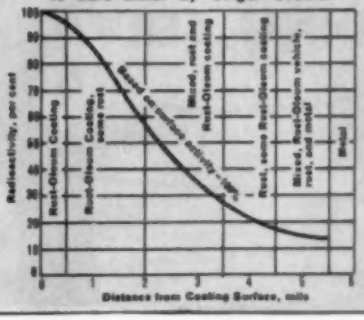


Chart shows results of tracing radio-activated Rust-Oleum through rust to bare metal by Geiger Counter.



LASTS LONGER

Applied over rust, Rust-Oleum lasts longer for the *over-the-years protection* you need. It resists sun, salt water, salt air, fumes, heat, humidity, moisture, weathering.

These are just a few of many important *differences* that separate Rust-Oleum from ordinary coatings. When you consider that Rust-Oleum covers approximately *30% more area,* depending upon surface condition and porosity . . . and the fact that Rust-Oleum finish coatings, with the same fish oil vehicle, are available in nearly every color for *double protection* . . . it's just good, common sense to use Rust-Oleum. Prompt delivery from Industrial Distributor stocks. Write for illustrated literature with color charts.

RUST-OLEUM®

STOPS RUST!®

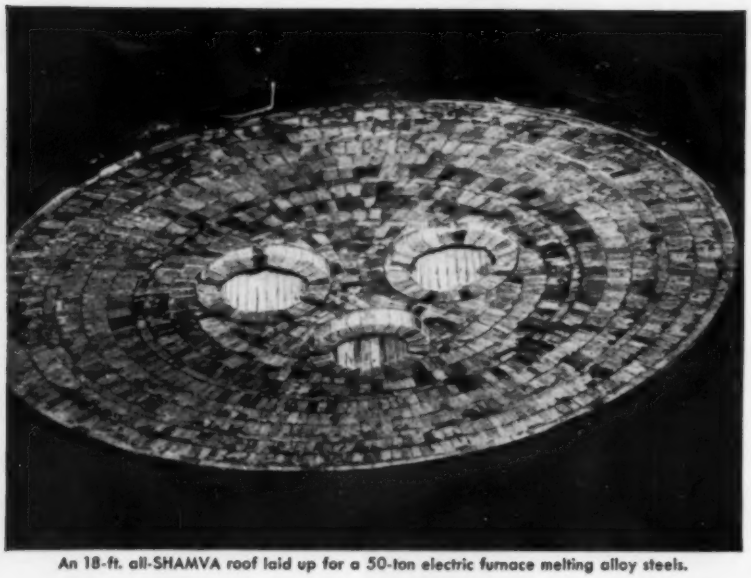
Rust-Oleum is distinctive as your own fingerprint. Accept no substitute.

ATTACH TO YOUR LETTERHEAD — MAIL TODAY

Rust-Oleum Corporation
2513 Oakton Street • Evanston, Illinois

- ☐ Complete literature with color charts.
- ☐ 30-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.

Rust-Oleum and Stops Rust are brand names and registered trademarks of the Rust-Oleum Corporation.



An 18-ft. all-SHAMVA roof laid up for a 50-ton electric furnace melting alloy steels.

In electric furnace operations

SHAMVA MULLITE GIVES YOU OUTSTANDING SERVICE

"Shamva" Electric Furnace Roof Brick is a coarse and open type refractory, giving you the extreme spalling resistance necessary in top charge electric furnace roofs.

- *High fusion point (3335°F.)*
- *High softening point (over 3000°F.)*
- *Low coefficient of expansion (3.66 x 10^{-6} per °C.)*
- *Anti-spalling (0.7% at 3000°F. Preheat, A.S.T.M. test)*
- *High load bearing strength (—3.1%, at 3000°F., 1½ hrs., 25 p.s.i. A.S.T.M. test)*
- *Low heat conductivity for greater furnace efficiency*

With "Shamva" Mullite Brick, roof life and production increase, down time and labor costs decrease.

Let our field engineers assist in your refractory installation.

WRITE TO: *Mullite Works, Laclede-Christy Division, H. K. Porter Company, Inc., Shelton, Conn.*

Distributors in principal cities

HKP MULLITE WORKS LACLEDE-CHRISTY DIVISION H. K. PORTER COMPANY, INC.

NEW PRODUCTS and equipment

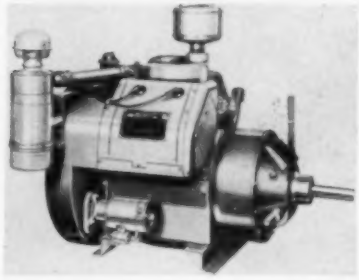
will clear a door 6 ft 8 in. high.

Fork lift components can be removed from the chassis in less than 15 minutes and replaced with a 10-cu-ft dumping hopper or one of two sizes of flatbeds. *Write*: Prime-Mover Co., Muscatine, Iowa.

Engine Is Air-Cooled

Model VR4D is rated at 56 hp at 2200 rpm. It has main roller bearings on both ends of the crankshaft.

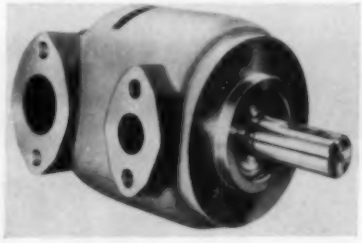
Valve life is long. Stellite exhaust valves and valve seat inserts are used with positive-type valve rotators.



Other features: Positive oil lubrication and a rotary-type outside magneto. *Write*: Wisconsin Motor Corp., Milwaukee 46, Wis. *Phone*: Evergreen 4-5800

Pump Has Balanced Vane

Automated and special machines (such as extrusion presses) and earth moving equipment can use these hydraulic pumps for continuous 2000 psi service.



The T Series pumps will supply up to 100 gpm at speeds up to 1800 rpm. Pumps can be mounted in any of four positions. Denison Engineering Division, American Brake Shoe Co., 1160 Dublin Rd., Columbus, O. *Phone*: Hudson 8-1191

NEW literature

Write directly to the company for a copy

Silicones

More than 115 applications of silicones are described in bulletin CDS-97, 8 pages. Silicone Products Department, General Electric Co., Waterford, N.Y.

Protected Smokestacks

Glass protected steel smokestacks and their resistance to corrosive flue gases are described in bulletin SS-202, 8 pages. Advertising Department, A. O. Smith Corp., Milwaukee 1, Wis.

Stainless Steel

This 4-page bulletin contains information on properties of 201 stainless steel. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Stainless Steel Castings

Properties of 17-4ph precipitation hardening stainless are presented in bulletin 5, 10 pages. Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland 10, Oreg.

Wrought Iron

Applications of wrought iron for railroads are depicted in this 36-page bulletin. A. M. Byers Co., P. O. Box 1076, Pittsburgh, Pa.

Wire Rope

This 8-page folder lists breaking strengths of various types of wire rope and recommended uses with earthmoving equipment. CenterFit, Wire Rope Division, Jones & Laughlin Steel Corp., Muncy, Pa.

Tube Machines

This 20-page bulletin describes machines for single or double flares, beads, squaring, burring and bending of ferrous and nonferrous tubing. Leonard Precision Products Co., 9200 Bolsa Ave., Santa Ana, Calif.

Machine Tools

Catalog M-1961, 72 pages, covers milling machines, broachers, cutter and tool grinding machines, grinding machines, grinding wheels, cutting fluids, selective hardening machines, metal forming machines and special machine tools. Cincinnati Milling Machine Co., Cincinnati 9, O.

Brazing Stainless

This 4-page bulletin, SD-24, discusses techniques and equipment for brazing and processing stainless

Increase cutting life up to 30%...with

DISSTON SEGMENTAL CIRCULAR SAWS!

Exclusive pin-lock feature *locks* segments together by aligning pins—permanently holding the segments in perfect alignment. Since there are no aligning rivets to limit sharpening, up to 30% more cutting life is possible.

DISSTON
U.S.A.
A
1
2
Exclusive pin-lock feature (A) eliminates aligning rivets generally used in segmental saws. Saws with aligning rivets can only be sharpened down to line 1. Disston Segmental Saws can be sharpened down to line 2, giving up to 30% more cutting life.

- **Replaceable high-speed steel segments need only infrequent sharpening.**
- **Narrow kerf assures fast, clean cutting with minimum waste.**
- **Teeth are accurately indexed so they may be sharpened on automatic machines.**
- **For cutting ferrous or non-ferrous metals.**
- **In diameters from 11″ to 63″.**

For cutting non-ferrous metals and plastics Disston also manufactures a complete line of solid tooth Diss-croloy and Alloy Circular Saws.

For new literature write to Disston-HKP, Philadelphia 35, Pa.

HKP Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.

NEW LITERATURE

steel, titanium and aluminum. Stainless Processing Division, Wall Colmonoy Corp., 19345 John R, Detroit 3, Mich.

Enclosed Motors

A line of re-rated fan cooled motors (½ to 40 hp) is covered in bulletin 500-A, 4 pages. Motor Division, Robbins & Myers Inc., Springfield, O.

Meters, Valves, Regulators

Catalog C-5000, 28 pages, covers gas meters, gages and pressure regulators; gasoline, oil and industrial meters; water meters and valves. Meter & Valve Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Milling Machines

A line of horizontal and vertical milling machines is described in this 6-page bulletin. Crowningshield Inc., 71 Country Club Rd., Greenfield, Mass.

Pneumatic Control

This 4-page bulletin, P99-3, describes a computing relay used in pneumatic control systems. Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.

Turret Tool Posts

Bulletin 19-T, 8 pages, describes tool posts with a clamping type handle that assures positive locking. McCrosky Tool Corp., S. Main St., Meadville, Pa.

Platen Conveyors

Steel platen conveyors for material handling, assembling, inspecting or machining operations are presented in bulletin C-1056, 4 pages. Visi-trol Engineering Co., 9345 Hubbell, Detroit 28, Mich.

Aluminum

This 6-page bulletin uses graphs to show the yearly corrosion rate of aluminum. More than 100 chemicals and other corrosive materials are covered. Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.

Packaging

This 24-page booklet tells how to ship economically in corrugated boxes. Hinde & Dauch Paper Co., Sandusky, O.

Milling Machines

Advantages of a line of ram type milling machines are covered in this 12-page bulletin. Van Norman Machine Co., Springfield 7, Mass.

Plastic Finish for Metals

A semirigid vinyl that can be laminated to sheet metal or continuous coils and then formed into parts is described in a 4-page bulletin. Masland Duraleather Co., Philadelphia 34, Pa.

Lubrication Problems

This 24-page bulletin describes an engineering program to help solve problems involving fuels, lubricants and other petroleum products. Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.

Lathes

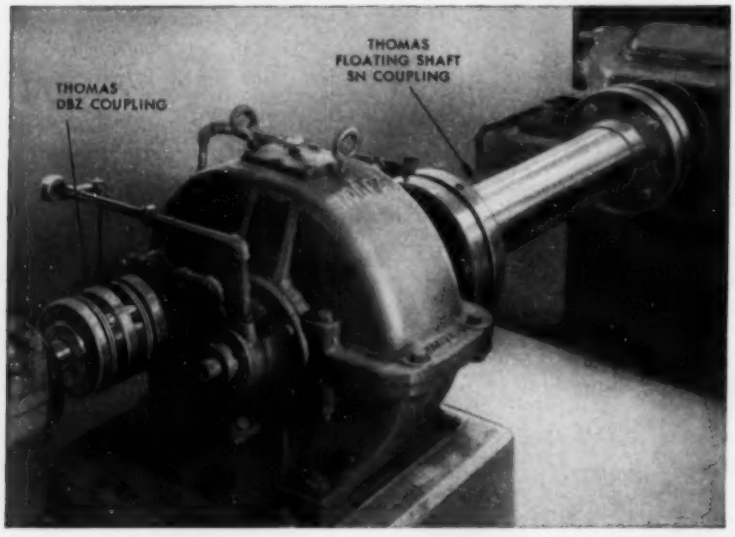
Bulletin 1256-3, 8 pages, describes a heavy duty engine lathe with a 25¾-in. swing over the bed. Bulletin 1256-2, 8 pages, describes a heavy duty 21¼-in. engine lathe. Tool room lathes are covered in bulletin 1256-1, 8 pages. Sidney Machine Tool Co., Sidney, O.

FILMS AVAILABLE

Action sequences of conveyor-type abrasive belt grinders with multiple heads are shown in "Two Heads Are Better Than One." It is a 16-mm color film of grinding operations on ferrous, nonferrous, plastic and other materials. Engelberg Huller Co. Inc., 831 W. Fayette St., Syracuse 4, N. Y.

THOMAS FLEXIBLE COUPLINGS

Give You Freedom From Coupling Maintenance



NO LUBRICATION **NO MAINTENANCE** **NO WEARING PARTS**

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.

They will protect your equipment and extend the life of your machines.

Properly installed and operated within rated conditions, Thomas Couplings should last a lifetime.

Under Load and Misalignment only Thomas Flexible Couplings offer all these advantages:

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

Sky Steel

Aircraft design today is a challenge unequalled in any period of the past. The exacting requirements to produce a superior result have pushed metallurgy and metal working beyond traditional practice.

The designer less often selects from standards but rather proposes new shapes and new materials to produce results beyond traditional thinking.

Cameron's contribution to this era has been the development of an unusual forging process for large, intricate ferrous components. Elimination of welds, better grain structure, internal as well as external curvatures, and considerable machining economy are making these remarkable "Sky Steel" forgings more popular every month. For complete information write or call . . .

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IRON WORKS, Inc.
P. O. Box 1212, Houston, Texas
SPECIAL PRODUCTS DEPARTMENT

OUR LIST OF CUSTOMERS INCLUDES: BENDIX PRODUCTS DIVISION, BENDIX AVIATION CORPORATION • CLEVELAND PNEUMATIC TOOL COMPANY • CURTISS-WRIGHT CORPORATION • FORD MOTOR COMPANY, AIRCRAFT ENGINE DIVISION • GENERAL ELECTRIC COMPANY, AIRCRAFT GAS TURBINE DIVISION • HAMILTON STANDARD DIVISION, UNITED AIRCRAFT CORPORATION • I-T-E CIRCUIT BREAKER COMPANY • H. W. LOUD MACHINE WORKS, INC. • PRATT AND WHITNEY AIRCRAFT • RHEEM MANUFACTURING COMPANY • RYAN AERONAUTICAL COMPANY • SOLAR AIRCRAFT COMPANY • THOMPSON PRODUCTS, INC. • WESTINGHOUSE ELECTRIC CORPORATION, AVIATION GAS TURBINE DIVISION

STEEL MEN!

WHAT IS THE COST OF A "CORHART BALANCED TANK"?

•

BECAUSE Corhart Electrocast sells for several times more than ordinary clay blocks, some operators have gotten the impression that a Corhart tank costs three or four times more than an all-clay furnace.

Nothing, however, could be further from the truth. By *balancing* his furnace with the proper amount of Electrocast, the average Corhart customer adds so little to the installation cost that the difference is repaid by a *fractional part of the extra production gained.*

If you have never obtained an estimate for a Corhart Balanced Tank, (a tank with all vulnerable spots fortified by Electrocast), we believe you will be more than surprised at the low cost for which this ideal type of installation can be made . . . . Send us the plans of your furnace, with a brief description of its past history. Using the experience gained in designing 65 Corhart Balanced Tanks, we will gladly recommend the amount and location of Electrocast needed to *balance* your furnace, and submit for your consideration complete blue-prints and quotations . . . . This service will cost you nothing, but it will probably prove the most interesting reading of the year. No obligation—and no high-pressure "follow-up." *Address:* Corhart Refractories Co., Incorporated, 16th and Lee Streets, Louisville, Kentucky.

QUALITY ECONOMY ENDURANCE

CORHART ELECTROCAST REFRACTORIES

WE RAN this ad for a Corhart Electrocast Refractory a little over 25 years ago—back when only a handful of glass manufacturers would think of using this new product, "one of the world's highest-priced refractories". Yet today virtually every furnace in the glass industry uses Corhart Electrocast . . .

Today Corhart 104 is new in the steel industry. And although it too is "one of the world's highest-priced refractories", it offers open-hearth furnace operators the same opportunties for greater production and lower costs that Corhart Electrocast brought to the glass industry.

Would you like to have complete data? Address: Corhart Refractories Co., *Incorporated,* 1632 West Lee Street, Louisville 10, Kentucky, U.S.A., SPring 8-4471.

QUALITY ECONOMY ENDURANCE

CORHART 104 ELECTROCAST REFRACTORY

The words "Corhart" and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, *Incorporated.* Corhart Refractories Co., *Incorporated,* 1600 West Lee Street, Louisville 10, Kentucky, U.S.A.—Telephone SPring 8-4471.

Market Outlook

THE STEEL INGOT rate is becoming more realistic.

It registered 92 per cent of capacity in the week ended Mar. 17. This is a 3 point decline from the preceding week, but it is not unexpected. A further orderly decline is coming.

At the beginning of 1957, most forecasters looked for this to be a record 120 million ton year. This could be achieved by operating at an average of 90 per cent of capacity.

ABOVE EXPECTATIONS—In the first two months, the ingot rate averaged 97.3 per cent of capacity. This is at a yearly pace of 129.8 million tons—a figure that even the most liberal optimists couldn't expect.

A rate of 92 per cent yields 2,355,000 tons a week. While this is the lowest tonnage output since the Christmas holiday week, it is at a yearly average of 122.8 million tons.

Because the first two months of this year averaged well above 90 per cent, some of the year will have to be below 90 if the year is to average 90.

CAUSES—The week ended Mar. 17 is the third one of decline. There are assorted reasons for the drop. Reduced demand for steel contributes to some of it. In the Chicago district, for example, U.S. Steel Corp. took off one blast furnace and three open hearths because of weakness in orders for some forms of steel, mainly cold rolled carbon sheets. Labor troubles in a Buffalo mill and an eastern Ohio mill pulled steel production rates down there. Continuation of a strike at plants producing oxygen for steel mills also is hampering steel production. A Cleveland mill took off some of its steelmaking facilities so the job of tying in a plant addition could go forward.

STRONG POINTS—The table below shows that some districts did not decline in the latest week.

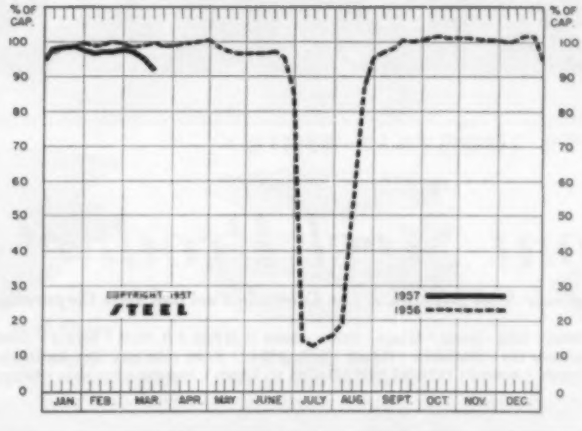
The reduced demand for steel is resulting in some increase in offerings of semifinished steel for overseas shipment.

PICKUP—While some forms of finished steel are in plentiful supply, others are in strong demand or are improving. In the New England area, where the steel production rate has been well below that of other districts, the demand for carbon bars for May and June delivery is slightly heavier than it has been. In the Philadelphia area, orders for large round and flat bars are well sustained. In Chicago, March purchases of merchant wire products by jobbers and dealers have been good. Demand for welded wire fabric for roads and concrete pipe is close to 100 per cent of capacity. Demand for building fabric is around 80 per cent of capacity. In Los Angeles, first quarter sales at warehouses will average 10 per cent above those of the corresponding period of last year.

STEEL PRICES RISE—Steel prices continue to inch upward. Tin mill products will rise an average of 4.5 per cent Apr. 30. Prices of industrial fasteners have gone up through a reduction of discounts by 2.5 to 3 points.

SCRAP DECLINES—The price of scrap—a raw material for steelmakers—declines. In the week ended Mar. 13, STEEL's price composite on steelmaking scrap was $50.33 a gross ton, a drop of $1.34 from that of the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Mar. 17	Change	Same Week 1956	Same Week 1955
Pittsburgh	96.5	— 1*	103	93.5
Chicago	91.5	— 3*	101	97
Mid-Atlantic	98	— 1.5	100	89
Youngstown	96	+ 2	98	96
Wheeling	92	— 5	97	93.5
Cleveland	88	— 2.5*	99.5	98
Buffalo	100	0	105	99
Birmingham	95.5	0	87.5	87.5
New England	66	— 1	80	85
Cincinnati	81	— 2.5*	99	90.5
St. Louis	91	— 4.5	101	87
Detroit	93	— 7.5	100	87.5
Western	104	0	102	94
National Rate	92	— 3	99.5	93

INGOT PRODUCTION‡

	Week Ended Mar. 17	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.7†	150.1	155.7	154.2
NET TONS (In thousands)	2,373†	2,411	2,501	2,477

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

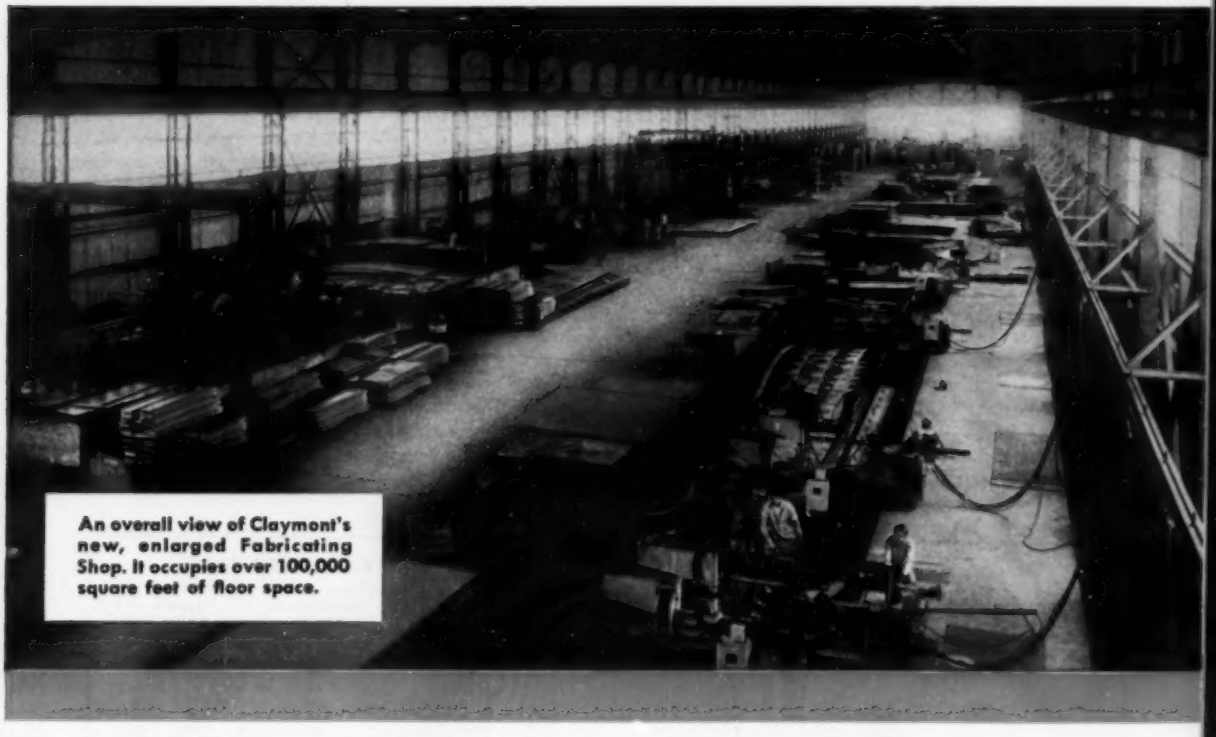
take advantage of Claymont's

If you have to turn down jobs because you don't have the right equipment . . . if you have equipment that's only being used part time . . . if you take "profit-killing" jobs to be of service to your customers . . . if you're interested in a new and easier way to handle difficult fabricating jobs . . . **it'll pay you to get the story on Claymont's Fabricating Service.**

You see, Claymont maintains a modern, fully-equipped machine and fabricating shop as part of its extensive steel mill operations. A shop that specializes in both difficult and mass-production operations.

What does this mean to you? It means that, before the steel ever leaves the mill, Claymont can perform the fabricating operations you don't want to handle. This eliminates needless scrap . . . stops freight, storage and handling costs on metal you can't use . . . enables you to make better use of your capital by reducing your needs for seldom-used patterns and equipment . . . and assures you of a constant steel supply from Claymont's widespread producing facilities.

For further details, contact your nearby CF&I representative or write today to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.



An overall view of Claymont's new, enlarged Fabricating Shop. It occupies over 100,000 square feet of floor space.

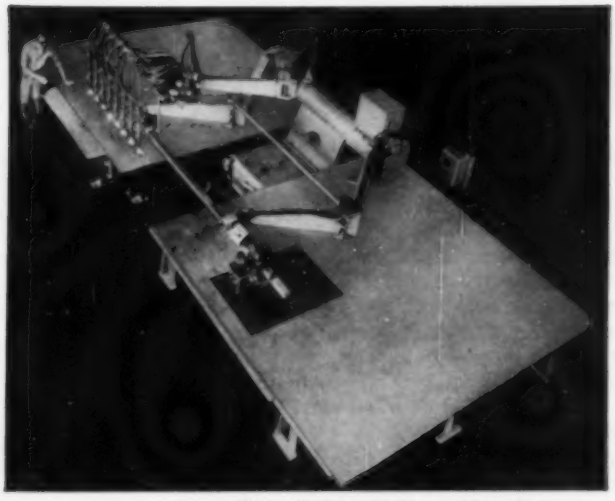
CF&I

Claymont Steel Products

Products of Wickwire Spencer Steel Division · The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln Los Angeles • New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland (Ore.) • Pueblo • Salt Lake City • San Francisco Seattle • Spokane • Tulsa • Wichita • CF&I OFFICES IN CANADA: Toronto • Montreal • CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

steel fabricating service



One of Claymont's multi-torch travographs which are used to produce a wide variety of flame-cut steel plate shapes.

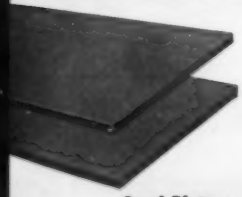
Can you use this Claymont machinery?

Multi-torch Travographs
Radiographs
Special Edge Preparation Burning Equipment
Heavy Duty Shears
Bending Roll
Press Brake
Mechanical Presses
Vertical Punching Equipment
Vertical Boring Mill
Radial Drills
Vertical Milling Equipment
Surface Grinding Equipment
Do-ALL Saw
Horizontal Turning Equipment

Claymont's new shop is equipped with several mechanical presses, including this one having a 400-ton capacity.

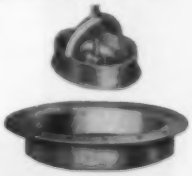
This 16-foot vertical boring mill enables Claymont to perform operations which are impractical for the average fabricating plant.

OTHER CLAYMONT PRODUCTS



Steel Plates
Alloy • High Strength Low Alloy
Stainless-Clad • Nickel Plated

Flanged and Dished Heads



Manhole Fittings and Covers

4258

Large Diameter Welded Steel Pipe

Tin Plate . . .

Tin Plate Prices, Page 187

Tin mill product base prices, both electrolytic and hot dipped, will go up 35 cents per base box (100 lb) for the next contracting period, Apr. 30 through Oct. 31. The increase was initiated by U.S. Steel Corp. and its operating divisions, Tennessee Coal & Iron, and Columbia-Geneva Steel. Other producers are expected to announce similar action before Apr. 30.

The estimated average increase is about 4.5 per cent. Under the new schedule, electrolytic tin plate (¼-lb coating) is quoted $8.75 per base box, f.o.b. Gary, Ind., and the Irvin Works, near Pittsburgh; $10.05 a box for hot-dipped tin plate; $7.85 for black plate.

Canmakers are critical of the proposed price increase, claiming they will have to pass it along to their customers and weaken the tin can's competitive position with other type containers. A similar protest was registered a year ago when prices went up 40 cents a base box. At that time, American Can Co. initiated installation of facilities in its own plants to process tin plate in coils. (Tin plate has been shipped from the steel mills in precut sheets.)

American Can hopes to begin using coils at its Tampa, Fla., plant next month. Columbia-Geneva Division of U.S. Steel begins shipping tin plate in coils this month. Others are installing equipment.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 186 & 187

In the sheet market, auto production and sales over the next several months still pose the big question. Current shipments of cold-rolled sheets are off, and the prospects are that April tonnage will be down substantially from February's.

So far, orders for May and June are coming in to the mills slowly. Lead time no longer means much since steelmaking operations are running at less than capacity, and mills give prompt shipment.

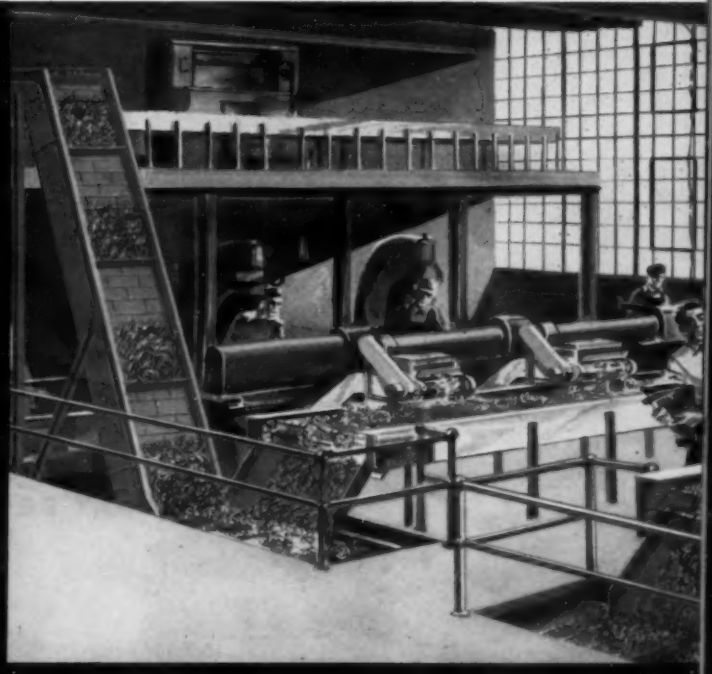
Weakness in the market at Chicago, mainly in cold-rolled sheets, has caused U.S. Steel Corp. to shut down one of its 11 blast furnaces and three of 31 open-hearth furnaces at its South Chicago Works. There has been no similar action at the Gary Works.

Chicago area sellers expect demand for galvanized sheets to improve seasonally as all forms of construction accelerate with the return of moderate weather. At Philadelphia, despite substantial consumption, shipments of hot and cold-rolled sheets still taper. Second quarter rolling schedules are still unfilled at Cleveland.

With the exception of nickel-bearing stainless, sheet and strip inquiries bring out sharp competition for orders in New England. Users there who have been paying up to $7 a ton more for flat rolled as result of recent increases in extras, are talking price concessions. So far, they have had no success at the mill level. This is the first time in years that sheet-strip consumers have ventured to press for lower prices.

MAY-FRAN

Conveyor Standardization SAVES YOU MONEY...



NOW...

Flat-rolled steel carry-overs will be virtually nil at the start of the second quarter. Some mills will have to dip into rather thin backlogs to maintain rolling schedules in April. Producers think consumer inventories will reach a practical minimum by April, however, and that specifications will be more lively during the latter part of the second quarter.

Steel Bars . . .

Bar Prices, Page 185

Reduction of carbon steel bar inventories by leading consumers is expected to hit bottom in April, and the low point in sales will probably come that month, say mill sales managers at Pittsburgh.

The expected upturn in automotive and farm equipment requirements in the second quarter is not likely to affect demand for hot-rolled bars until May and June.

Suppliers of cold-drawn bars had slow first quarter sales. Most are accepting orders with only 30 day lead time.

Bar rolling cycles still are well filled in the Chicago area, but demand pressure is off somewhat. The slump in automotive requirements isn't as severe in bars as it is in sheets.

Specifications for large rounds and flats are well sustained at Philadelphia. Over-all volume there continues to ease. Orders are slightly heavier for May-June shipment in New England. Pressure for April tonnage in the area is light.

New England converters are not operating at capacity, and hot stock inventories are sufficient to meet the moderate bulge in second quarter demand without difficulty. This also applies to alloys, except where specifications call for heat-treated, ground or polished stock.

Ferroalloy Prices

FERROALLOY quotations remain unchanged. The current price schedule was published in full on page 168 of the Mar. 4 issue of STEEL.

Tubular Goods . . .

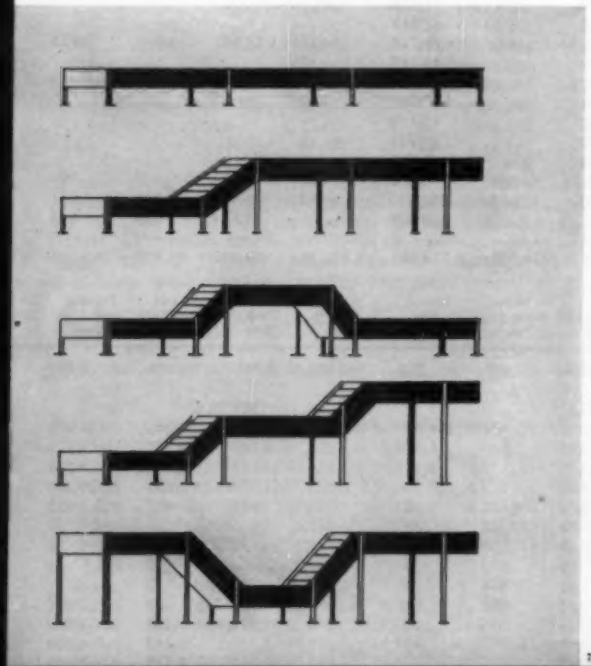
Tubular Goods Prices, Page 189

Buttweld pipe sales are slow currently, with consumers ordering on short lead time. Sales usually rise at this season.

Other tubular goods are in brisk demand. Pressure and mechanical tubing sales are described as good, though automotive purchases of mechanical lack large volume. Oil country tubing sellers have received some order cancellations, but many consumers still seek extra second quarter tonnage.

Seamless pipe and tubing are well sold up through the second quarter in New England. Electric-weld is not much easier. Tie-in sales with buttweld are frequent. Distributors are well stocked with buttweld. Utilities are seeking more seamless tonnage and earlier deliveries.

Cast iron pipe sales agencies anticipate a good volume year. Seasonal demand is expected to develop within 30 days. Seattle seeks a sizable tonnage of 6 and 20-in. pipe.



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Warehouses Top List of Mill Customers

WAREHOUSES once again became the leading customers of the steel mills in 1956 after taking a back seat to the automotive industry the year before.

Of the 21 market classifications listed below, all but five increased their share of mill shipments last year. (The exceptions: Automotive, agricultural, appliances and ordnance declined; oil and gas drilling stayed even.) Even though percentage increased, in some cases tonnages did not. The midyear steelworkers' strike cut shipments of finished steel almost 1.5 million tons below the 1955 level.

Good for Some—If motordom had taken anywhere near the tonnage it did in record 1955, the steel industry would have had to produce nearly 117 million tons of ingots to satisfy other users.

The distribution of steel by products also underwent considerable change last year. Cold-rolled sheets still dominated the tonnage figures, but they slipped from 17.90 per cent of 1955 shipments to 16 per cent of 1956 shipments. Structural steel rose from 5.59 per cent to 6.43 per cent and plates from 7.98 per cent to 9.27 per cent of total distribution.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

DISTRIBUTION OF FINISHED STEEL BY MARKET CLASSIFICATION DURING 1956

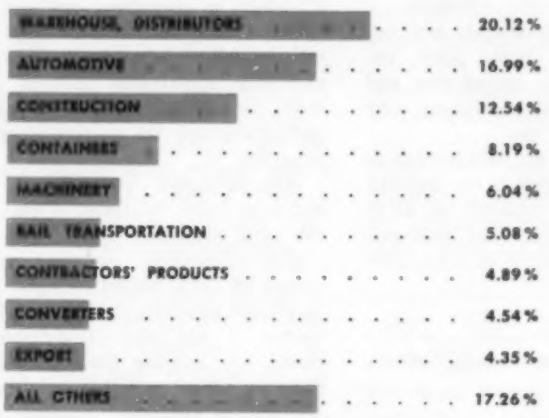
Net tons of mill shipments of all grades, including alloy and stainless

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, and Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes (heavy)	Steel Piling	Plates	Standard Rails (over 60 lb)	Rails (all other)	Joint Bars	Tie Plates
Converters, Processors	439,262	100,185	396,538	936	43	140,444	33	12	1,387	13
Forgings (except automotive)	930,424	....	1,554	....	....	19,995	....	....	....	....
Bolts, Nuts, Rivets, Screws	45,127	....	310,090	....	....	3,038	....	....	....	....
Jobbers, Dealers, Distributors	70,680	3,454	55,861	1,116,073	52,790	1,365,053	19,304	25,282	2,465	1,482
Construction, Maintenance	138,005	....	42,200	2,884,454	341,524	1,811,280	50,261	29,159	2,614	3,914
Contractors' Products	8,797	....	58,590	23,618	....	198,776	....	....	....	....
Automotive	504,105	....	56,988	44,809	....	418,858	....	....	....	....
Rail Transportation	51,866	....	253	473,801	479	942,398	1,043,211	13,011	69,506	280,613
Shipbuilding, Marine Equip.	5,995	....	159	115,647	1,806	531,485	212	342	....	....
Aircraft	32,839	....	3	4,010	....	11,326	....	....	....	....
Oil & Gas Drilling	59,099	....	....	50,660	535	35,863	....	....	....	....
Mining, Quarrying, Lumbering	4,443	....	84	23,572	450	79,742	36,371	17,101	1,504	2,722
Agricultural	21,803	....	9,106	36,134	....	92,192	....	....	....	....
Machinery, Indust. Equip., Tools	179,568	....	134,002	254,587	....	1,448,254	3,120	5,645	199	63
Electrical Machinery & Equip.	6,655	....	25,134	34,941	....	157,991	....	....	....	....
Appliances, Utensils, Cutlery	33	....	1,062	4,330	....	15,179	....	....	....	....
Other Domestic, Commercial Equip.	741	....	15,919	4,572	....	20,942	....	....	....	....
Containers	15,299	....	1,184	1,244	....	50,892	....	....	....	....
Ordnance & Other Military	179,850	6,667	218	8,206	588	108,560	1,891	26	1	297
Export	292,363	87,519	19,223	267,387	35,888	253,296	46,951	5,800	3,225	8,841
Unclassified	3,960	....	4,266	....	....	9,059	....	1,984	656	256
Totals	2,990,914	197,825	1,132,434	5,348,981	434,103	7,714,623	1,201,354	98,362	81,557	298,201

Market Classification	Mechanical Tubing	Pressure Tubing	Wire, Drawn	Nails and Staples	Wire, Barbed and Twisted	Woven Wire Fence	Bale Ties	Black Plate	Tin and Terne Plate (hot-dipped)	Tin and Terne Plate (electrolytic)
Converters, Processors	4,462	3,054	992,951	1,381	47	234	—4	6,961	393	1,542
Forgings (except automotive)	....	....	....	....	....	....	....	....	....	....
Bolts, Nuts, Rivets, Screws	....	....	324,468	....	....	....	....	589	....	....
Jobbers, Dealers, Distributors	193,548	104,782	312,656	520,304	71,474	259,057	48,008	101,627	44,386	128,259
Construction, Maintenance	26,690	15,870	62,367	6,586	677	6,454	32	4,747	1,197	3,778
Contractors' Products	58,337	8,763	91,550	1,610	....	4,133	....	26,145	2,367	4,088
Automotive	164,863	10,717	222,798	246	....	....	....	13,309	2,651	29,135
Rail Transportation	1,997	1,189	2,559	3,619	1,128	2,183	....	906	487	222
Shipbuilding, Marine Equip.	382	1,267	624	72	....	....	....	....	....	70
Aircraft	7,256	163	2,011	19	....	....	....	59	....	20
Oil & Gas Drilling	21,841	2,774	241	11	....	....	....	....	113	—1
Mining, Quarrying, Lumbering	2,923	28	2,073	255	4	5	....	25	2	....
Agricultural	18,263	89	13,246	235	16	109	....	1,092	70	595
Machinery, Indust. Equip., Tools	210,865	65,027	255,690	3,756	....	....	....	12,232	3,138	12,025
Electrical Machinery & Equip.	15,125	284	68,271	298	....	....	....	5,582	1,862	6,704
Appliances, Utensils, Cutlery	10,051	7,688	53,997	241	1	....	....	49,017	7,153	17,820
Other Domestic, Commercial Equip.	30,089	31	379,155	1,012	....	....	....	94,203	10,864	22,120
Containers	4,780	1	91,022	7,768	21	....	1,575	411,229	509,251	4,072,061
Ordnance & Other Military	15,506	787	6,428	253	5	45	1	129	513	274
Export	11,668	3,185	37,628	1,526	945	1,132	60	37,203	365,623	316,356
Unclassified	151,200	159,289	68,642	8,091	....	....	....	....	....	....
Totals	949,846	384,988	2,988,377	557,283	74,318	273,352	49,672	765,055	950,070	4,615,068

Tables compiled by STEEL from American Iron & Steel Institute figures.

WHO GOT THE STEEL—1956



Where Alloy, Stainless Steel Went

(Mill Shipments in 1956)	Alloy, other than stainless net tons	Stainless net tons
Converters, Processors	93,732	56,160
Forgings (except automotive)	534,862	27,136
Bolts, Nuts, Rivets, Screws	85,587	8,809
Jobbers, Dealers, Distributors	605,908	227,465
Construction, Maintenance	110,162	5,439
Contractors' Products	19,106	16,632
Automotive	1,619,252	101,487
Rail Transportation	212,316	3,710
Shipbuilding, Marine Equipment	71,517	2,290
Aircraft	73,095	33,990
Oil and Gas Drilling	230,169	1,368
Mining, Quarrying, Lumbering	31,908	464
Agricultural	29,674	1,213
Machinery, Industrial Equip., Tools	676,384	56,936
Electrical Machinery and Equipment	598,236	19,728
Appliances, Utensils, Cutlery	21,158	44,413
Other Domestic, Commercial Equipment	29,567	15,318
Containers	35,722	2,904
Ordnance and Other Military	84,386	3,867
Export	209,596	22,054
Unclassified	186,076	36,319
Total	5,558,413	687,699

Track Spikes	Wheels	Axles	Bars, Hot-Rolled (and light shapes)	Bars, Concrete Reinforcing	Bars, Cold-Finished	Bars, Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Market Classification
94	37	....	289,671	41,418	4,467	707	21,425	21,370	2,430	Converters, Processors
....	....	....	516,350	....	3,645	1,072	....	....	....	Forgings (except automotive)
....	....	....	619,669	....	86,188	111	....	....	....	Bolts, Nuts, Rivets, Screws
8,270	231	27	1,569,806	1,085,383	476,061	21,298	2,094,815	2,025,399	913,638	Jobbers, Dealers, Distributors
2,008	4,732	1,239	728,366	1,118,935	5,650	80	176,793	29,885	1,973,361	Construction, Maintenance
....	....	....	242,838	41,315	24,160	24	189,950	....	15,201	Contractors' Products
....	....	....	2,107,714	....	384,952	639	4,016	....	80	Automotive
79,086	324,173	165,654	389,092	732	7,981	11	10,361	....	879	Rail Transportation
....	89	....	43,003	301	4,629	4	14,726	....	6,878	Shipbuilding, Marine Equip.
....	....	....	35,797	....	14,306	47	774	....	416	Aircraft
....	190	....	198,508	569	13,113	....	21,360	311,708	50,119	Oil & Gas Drilling
1,095	2,002	713	125,231	737	6,534	1,691	6,335	261	728	Mining, Quarrying, Lumbering
....	....	....	305,597	1,484	63,411	15	27,321	....	540	Agricultural
108	13,350	1,106	990,394	....	410,120	18,097	36,587	....	33,595	Machinery, Indust. Equip., Tools
....	184	11	151,032	....	51,280	588	254,331	....	4,940	Electrical Machinery & Equip.
....	....	....	23,784	487	41,212	87	8,990	....	116	Appliances, Utensils, Cutlery
....	....	....	87,621	95	49,386	134	7,214	....	922	Other Domestic, Commercial Equip.
....	....	....	6,460	....	995	9	4,009	....	....	Containers
38	11	....	79,140	....	22,392	18	1,215	....	1,150	Ordnance & Other Military
2,768	3,397	3,030	179,631	83,927	14,919	61	47,086	171,600	314,577	Export
....	....	....	150,645	143,308	50,968	81,173	....	....	56,493	Unclassified
93,467	348,396	171,780	8,840,349	2,518,691	1,736,369	125,866	2,927,308	2,560,223	3,376,063	Totals

Sheets, Hot-Rolled	Sheets, Cold-Rolled	Sheets, Galvanized	Sheets, Coated (all other)	Sheets and Strip, Electrical	Strip, Hot-Rolled	Strip, Cold-Rolled	Net Total	Per Cent of Total	Market Classification
652,835	255,680	24,898	1,406	86	209,691	160,470	3,776,559	4.54	Converters, Processors
15	117	....	....	....	....	14	1,473,186	1.77	Forgings (except automotive)
65,406	5,523	445	....	....	5,387	19,046	1,485,087	1.78	Bolts, Nuts, Rivets, Screws
1,263,089	1,556,445	953,995	16,843	6,374	184,456	79,558	16,752,233	20.12	Jobbers, Dealers, Distributors
521,846	166,683	187,789	3,299	....	75,424	13,227	10,441,126	12.54	Construction, Maintenance
836,820	1,013,129	965,222	14,576	2,083	102,422	140,063	4,074,577	4.89	Contractors' Products
3,055,521	5,949,544	89,057	118,647	4,215	551,144	407,879	14,141,887	16.99	Automotive
249,828	20,172	49,699	134	6,535	29,403	3,486	4,226,654	5.08	Rail Transportation
19,859	2,682	6,116	2,344	336	866	412	760,306	0.91	Shipbuilding, Marine Equip.
8,695	8,692	1,734	377	659	739	4,759	134,721	0.16	Aircraft
7,552	2,701	459	31	156	935	177	778,714	0.94	Oil & Gas Drilling
16,045	5,014	834	16	339	9,162	1,467	349,508	0.42	Mining, Quarrying, Lumbering
150,776	77,086	180,057	5,551	292	72,446	4,933	1,082,459	1.30	Agricultural
441,123	246,453	37,573	7,000	9,238	127,735	70,949	5,031,599	6.04	Machinery, Indust. Equip., Tools
229,265	456,127	55,228	11,266	683,778	76,334	140,593	2,437,804	2.93	Electrical Machinery & Equip.
173,480	1,398,627	125,139	20,623	16,798	23,988	129,212	2,129,115	2.56	Appliances, Utensils, Cutlery
152,699	1,069,416	64,678	8,794	6,433	57,647	179,088	2,263,775	2.72	Other Domestic, Commercial Equip.
565,759	663,090	54,112	1,978	....	231,938	123,684	6,818,361	8.19	Containers
47,894	28,419	3,011	57	106	2,328	7,866	523,890	0.63	Ordnance & Other Military
318,479	391,402	157,925	13,614	75,953	30,100	18,139	3,622,427	4.35	Export
13,554	....	....	....	....	4,012	39,624	947,180	1.14	Unclassified
8,790,540	13,317,002	2,957,991	226,556	813,381	1,796,157	1,544,646	83,251,168	100.00	Totals

Wire . . .

Wire Prices, Pages 187 & 188

Individual orders for carbon steel industrial wire average somewhat heavier for April-May, but many users are slow to cover their second quarter needs. Reason: Prompt deliveries are available on most grades, with mill backlogs thin.

Some users frequently seek tonnage after normal lead time closing. Most buyers appear to be taking their cue from the automotive trade, delaying commitments and asking for prompt shipments. This tends toward a slow start each month with a gradual pickup in buying as the month advances.

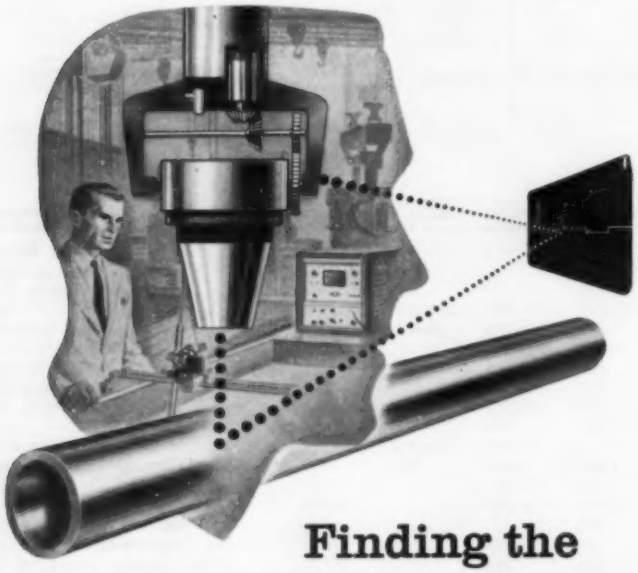
Most price increases are now operative. Among base price advances, upholstery spring wire and hard drawn MB grade spring wire are both up $6 a ton.

In the East, nail distribution is upset by lower prices on imports. They are being offered at $1.75 to $2 a keg under the domestic market. An increase in rope wire prices is contemplated, but rope at the secondary distributor level is subject to erratic quotations.

Midwestern producers look for a pickup in merchant demand as spring nears. March purchases by jobbers and dealers have been good, and this constitutes part of the basis for optimism. Nail demand and production are holding close to capacity.

Manufacturers wire volume is suffering from the reduced pace of the auto industry. Compared with January-February last year, shipments of both manufacturers and merchant products are off approximately 2 per cent. Construction items are moving well, although building fabric is softer because of the dip in residence construction. Demand for road and pipe fabric is close to 100 per cent of capacity, with building fabric around 80 per cent.

Wiremakers, generally, continue optimistic that 1957 will be a good volume year.



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Tool Steel . . .

Tool Steel Prices, Page 189

Shipments of high speed and tool steel (excluding hollow drill steel) amounted to 9457 tons in January, reports the American Iron & Steel Institute. This was up from the 8672 tons reported for December, but was down from the 11,113 tons reported for January, 1956.

Warehouse . . .

Warehouse Prices, Page 190

Distributors have not had the improvement in business they usually experience at this season. Small manufacturers are generally well supplied with steel. Some increases in stocks are expected in late second quarter because of anticipated price increases at mid-year.

Except for plates and shapes, stocks can be rounded out as mills ship more freely. It is no longer a case of accepting all that mills want to ship; warehouses once more can be selective in their intake.

Improved deliveries and supply of sheets and bars have reduced fill-in buying from warehouses by industrial consumers. At the same time, shortages of plates and struc-

turals limit the ability of distributors to fill many inquiries. This stringency is easing in light plates. They account for up to 90 per cent of plate volume at most warehouses.

Distributors are still unable to keep up with demand for heavy plates and wide flange sections.

Some plates from Chile are arriving on the West Coast. Japan is shipping nails to this country, but her prices on bars and strip are too high to compete effectively.

First quarter sales records for the Los Angeles district will show a significant increase in warehouse activity. For the first three months of the year, they will average 10 per cent higher than they did in the like 1956 period.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 185

Reinforcing steel bar demand reflects some pickup, but the gains are not up to seasonal expectations. Tight money is holding up some building projects. Certain others are being delayed pending further review of costs and general economic conditions.

Extensive highway construction will provide strong market support over the coming months.

Featuring active work in the Philadelphia area is a 4000-ton apartment house development.

Plates . . .

Plate Prices, Page 185

Midwestern suppliers say there has been no increase in setbacks for heavy plates and shapes, but some easing in these products is thought inevitable as over-all demand for steel declines.

Two factors are contributing to this: 1. As steelmaking falls below full capacity, more ingots can be allocated to the heavy products. 2. With pressure off in the sheet market, more strip mill plates can be produced to ease some of the burden on the plate mills.

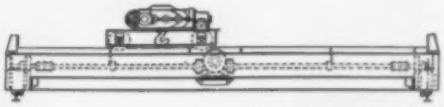
Despite the prospects for some supply easing, the current amount of highway and toll road building and industrial construction in northern Illinois alone provides convincing evidence that shapes and plates will be in uncomfortably tight supply in the Midwest all year.

Heavy plate supplies are extremely tight, though light plates up to ½-in. are more plentiful. Supply and demand for plates up to and including ⅜-in. are in fair balance at Philadelphia. Jobbers' stocks are increasing, indicating a slackening in consumer interest at above mill prices. There have been a few order cancellations and shipment deferments by consumers of plates ⅜-in. and smaller.

Boston area tankmakers are being offered ample light plate tonnage (½-in. and under up to 72-in. wide) for May-June delivery. Other users find the plate supply situation easier also. Tanks for gasoline storage are in brisk demand, including turnpike service installations in Connecticut and Massachusetts. Weldment and other shops building heavy equipment are unable to place all the second quarter orders for thick plate that they would like to.

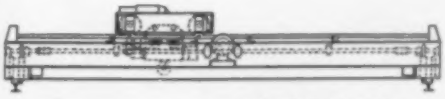
One point being watched closely is the situation in the sheet market. Should automotive interests

STANDARD HEADROOM
Provides highest hook height with top-running trolley and foot mounted hoisting unit.



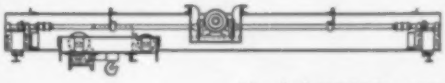
Model DTMD—TT

MEDIUM HEADROOM
Here the hoisting unit is rigidly suspended from the top-running trolley to reduce clearance over rail.



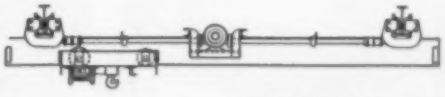
Model DTMD—LT

LOW HEADROOM
Under-running trolley permits unusually high hook lift. Use it where clearance under bridge must be maximum.



Model DTMD—UT

SUSPENDED TRACK
Operates on lower flange of crane runway suspended from roof guiders or other overhead support. Use also where load transfer is desired.



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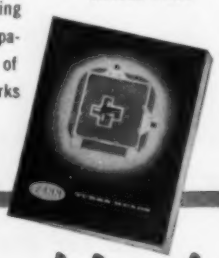
TO KEYSTONE

IN A SINGLE PASS



FENN Turks Heads

THE FENN MANUFACTURING COMPANY 401 FENN ROAD, NEWINGTON, CONNECTICUT

re-enter the market, some capacity now engaged in rolling light gage plates would likely resume rolling sheets. A tightening up in light plates would be certain.

Consumers of heavy plates will continue to depend partially on imports and conversion tonnage to fill their second quarter requirements.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 188

Industrial fastener prices have been advanced to reflect recent increases in bar and wire stock. Lamson & Sessions Co., Cleveland, was the first large producer to take action. Republic Steel Corp. followed quickly. Generally, discounts on bolts, nuts, capscrews, etc., are lowered 2½ and 3 points. Leading producers of rivets increased prices a couple weeks ago.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 191

Contract to design and erect a battery of 60 coke ovens has been awarded to Koppers Co. Inc., Pittsburgh, by the U.S. Pipe & Foundry Co., Birmingham. The ovens will be the Koppers-type gun flue, with auxiliary equipment. When completed, U.S. Pipe & Foundry's coke capacity at Birmingham will be increased approximately 30 per cent. The new ovens will have capacity to carbonize 1160 net tons of coal daily. The company has 180 ovens in operation at Birmingham. Two batteries of 30 ovens each were built by Koppers.

Pig Iron . . .

Pig Iron Prices, Page 190

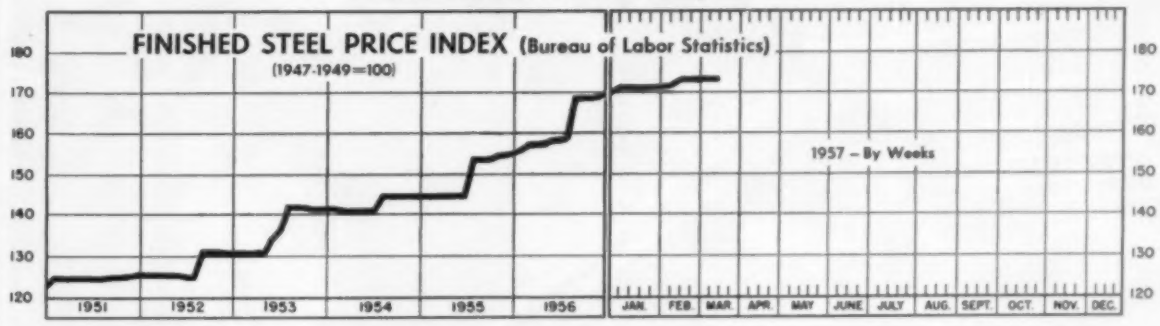
Pig iron demand continues to be spotty. Some foundries are fairly busy, while others are operating less than five days a week. Most customers are buying on a hand-to-mouth basis, intent on keeping inventories down.

Consumers of merchant iron in the Philadelphia district are paying $2 a ton higher on the basis of delivered prices from Swedeland, Pa., for basic, No. 2 foundry, malleable and bessemer; from Troy, N. Y., for low phos.

The pig iron market at Buffalo

(*Please turn to page* 192)

Price Indexes and Composites



Mar. 12 1957	Week Ago	Month Ago	Feb. Avg.	Year Ago
173.8	173.8	173.1	173.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 12

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350	Bars, Reinforcing	5.788
Rails, Light, 40 lb	6.817	Bars, C.F., Carbon	9.910
Tie Plates	6.275	Bars, C.F., Alloy	13.450
Axles, Railway	9.400	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.967	Sheets, Galvanized	8.230
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.274	Strip, C.R., Carbon	5.543
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.150	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 303 (lb)	0.568	Pipe, Black, Buttweld (100 ft)	18.894
Bars, H.R., Carbon	6.075	Pipe, Galv, Buttweld (100 ft)	23.634
		Pipe, Line (100 ft)	190.108
		Casing, Oil Well, Carbon (100 ft)	185.544
		Casing, Oil Well, Alloy (100 ft)	288.930
		Tubes, Boiler (100 ft)	45.476
		Tubing, Mechanical, Carbon (100 ft)	23.367
		Tubing, Mechanical, Stainless, 304 (100 ft)	197.563
		Tin Plate, Hot-dipped, 1.25 lb	9.432
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.323
		Wire, Drawn, Carbon	9.775
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	39.505

STEEL's FINISHED STEEL PRICE INDEX*

	Mar. 13 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	227.41	227.41	227.10	209.10	171.92
Index in cents per lb	6.161	6.161	6.152	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$139.51	$139.51	$139.51	$128.02	$106.32
No. 2 Fdry Pig Iron, GT	64.56†	64.56†	62.63	58.99	52.54
Basic Pig Iron, GT	64.11†	64.11†	62.18	58.49	52.16
Malleable Pig Iron, GT	65.63†	65.63†	63.41	59.77	53.27
Steelmaking Scrap, GT	50.33	51.67	53.17	49.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Mar. 13 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars,H.R...deld., Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.90	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.90	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.85-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$5.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	Mar. 13 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$65.50	$65.50	$63.50	$58.50	$53.00
Basic, Valley	64.50	64.50	62.50	58.50	52.00
Basic, deld., Phila.	68.38	66.26	66.26	62.12	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	65.00	65.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	68.88	66.76	66.76	62.66	57.11
No. 2 Fdry Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	63.00	59.00	52.50
Malleable, Chicago	65.00	65.00	63.00	59.00	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	205.00†	188.00*

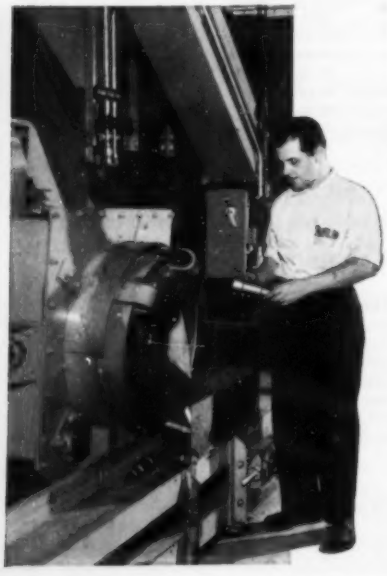
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$50.50	$51.50	$53.50	$48.50	$44.00
No. 1 Heavy Melt, E. Pa.	54.00	56.00	58.00	50.00	42.50
No. 1 Heavy Melt, Chicago	46.50	47.50	49.50	49.00	42.50
No. 1 Heavy Melt, Valley	48.50	48.50	53.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	45.50	45.50	51.50	50.50	43.00
No. 1 Heavy Melt, Buffalo	48.50	50.50	53.50	47.50	43.00
Rails, Rerolling, Chicago	59.50	61.00	64.50	66.50	52.50
No. 1 Cast, Chicago	42.50	45.50	48.50	48.50	49.00

COKE, Net Ton					
Beehive, Furn, Connisvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connisvl.	18.00	18.00	18.00	18.50	17.50

NO MAN HOURS FOR CLEANING HERE!

airless blast equipment becomes an integral part of automated line in processing automotive forgings



The picture above was taken during the normal production schedule of a large, mid-western automotive plant. The 26″ Continuous Wheelabrator Tumblast shown is one of several that have been incorporated into automated processing lines for forgings and machined parts. Forgings, brought to the machine by lift truck are dumped from the tote box (shown upended at the right of picture) into a hopper, and then fed by conveyor into the high-production airless blast Continuous Tumblast where all forging scale is uniformly removed. Emptying on to another conveyor, the cleaned forgings are carried on to heat treat operations, into another Wheelabrator machine, and then on to machining. High capacity and freedom from mechanical problems and maintenance difficulties assure required performance of Wheelabrator equipment with a very minimum of attention.

For detailed information on Wheelabrator principles and savings, write today for your free copy of Bulletin 74-C

WHEELABRATOR
CORPORATION
509 South Byrkit Street Mishawaka, Indiana

Steel Prices

Mill prices as reported to STEEL, Mar. 13, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 186; to footnote, page 188.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 .....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 .....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 .....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 .....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5...74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 .....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport,Conn. N19..107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3..114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2..107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ....107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14..111.50
S.Duquesne,Pa. U5 ...111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 .....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ...4.625

WIRE RODS

AlabamaCity,Ala. R2 ...5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 .....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 .....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.25
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.10
Lackawanna,N.Y. B2 ...5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2..5.25
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1..7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.45
Lackawanna,N.Y. B2 ...7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 .....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ...7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ...4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 .....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1..4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ...4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1..4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....6.75
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2...5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 .....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 .....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ....5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10...5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.325
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ...5.175
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2...5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 .....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11..5.775
Youngstown(9) R2, U5..5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ...6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1..6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 .....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 .....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 .....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14..7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 .....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2...5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 .....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.575
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.55
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles F2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12, R2..6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ...7.20
Buffalo R5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13 .6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles F2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ...6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 .....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 .....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles F2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.325
Bridgeport,Conn. N19 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.85

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Ft. Worth,Tex.(42) T4..5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....6.10
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ....6.10
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14, 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ...4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ...6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshonocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1..8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Ejectro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.675
Allenport,Pa. P7 .....4.675
Alton,Ill. L1 .....4.875
Ashland,Ky.(8) A10 ...4.675
Atlanta A11 .....4.875
Bessemer,Ala. T2 .....4.675
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Houston S5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.675
Johnstown,Pa.(25) B2..4.675
KansasCity,Mo. S5 ....4.925
Lackaw'na,N.Y.(25) B2 4.675
LosAngeles(25) B3 ....5.425
Minnequa,Colo. C10 ...5.775
Pittsburg,Calif. C11 ...5.425
Riverdale,Ill. A1 .....4.675
SanFrancisco S7 .....5.95
Seattle(25) B3 .....5.675
Seattle N14 .....5.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 .....4.675
S.SanFrancisco(25) B3..5.425
SparrowsPoint,Md. B2..4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Torrance,Calif. C11 ...5.425
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5 .....4.675

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
LosAngeles B3 .....8.95
Newport,Ky. A2 .....7.75
Sharon,Pa. S3 .....7.75
S.Chicago,Ill. W14 ....7.75
Youngstown U5, Y1 ....7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....6.95
Conshohocken,Pa. A3 ...6.95
Ecorse,Mich. G5 .....7.05
Fairfield,Ala. T2 .....6.95
Gary,Ind. U5 .....6.95
Houston S5 .....7.20
Ind.Harbor,Ind. I-2, Y1..6.95
KansasCity,Mo. S5 ....7.20
Lackawanna,N.Y. B2 ...6.95
LosAngeles(25) B3 ....7.70
Seattle(25) B3 .....7.95
Sharon,Pa. S3 .....6.95
S.SanFrancisco(25) B3 ..7.70
SparrowsPoint,Md. B2...6.95
Warren,O. R2 .....6.95
Weirton,W.Va. W6 .....6.95
Youngstown U5, Y1 ....6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.925
Warren,O. R2 .....5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.85
Baltimore T6 .....6.85
Boston T6 .....7.40
Buffalo S40 .....6.85
Cleveland A7, J5 .....6.85
Conshohocken,Pa. A3 ...6.90
Dearborn,Mich. D3 ....6.95
Detroit D2, M1, P20....6.95
Dover,O. G6 .....6.85
Ecorse,Mich. G5 .....6.95
Follansbee,W.Va. F4 ...6.85
Fontana,Calif. K1 .....8.70
FranklinPark,Ill. T6 ...6.95
Ind.Harbor,Ind. Y1 ....6.85
Indianapolis C8 .....7.00
LosAngeles C1 .....8.90
NewBedford,Mass. R10..7.30
NewBritain(10) S15 ....6.85
NewCastle,Pa. B4, E5 ..6.85
NewHaven,Conn. D2 ...7.30
NewKensington,Pa. A6..6.85
Pawtucket,R.I. R3 .....7.50
Pawtucket,R.I. N8 .....7.40
Pittsburgh J5 .....6.85
Riverdale,Ill. A1 .....6.95
Rome,N.Y.(32) R6 .....6.85
Sharon,Pa. S3 .....6.85
Trenton,N.J.(31) R5 ....8.30
Wallingford,Conn. W2 ..7.30
Warren,O. R2, T5 .....6.85
Weirton,W.Va. W6 .....6.85
Worcester,Mass. A7 .....7.40
Youngstown C8, Y1 ....6.85

STRIP, Cold-Rolled Alloy

Boston T6 .....14.90
Carnegie,Pa. S18 .....14.55
Cleveland A7 .....14.55
Dover,O. G6 .....14.55
FranklinPark,Ill. T6 ..14.55
Harrison,N.J. C18 .....14.55
Indianapolis C8 .....14.70
Pawtucket,R.I. N8 ....14.90
Sharon,Pa. S3 .....14.55
Worcester,Mass. A7 ...14.85
Youngstown C8 .....14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.00
Dearborn,Mich. D3 ....10.10
Dover,O. G6 .....10.10
Ecorse,Mich. G5 .....10.10
Ind.Harbor,Ind. Y1 ....10.20
Sharon,Pa. S3 .....10.00
Warren,O. R2 .....10.00
Weirton,W.Va. W6 ....10.00
Youngstown Y1 .....10.20

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.60

STRIP, C.R. Electrogalvanized

Cleveland A7 .....6.85*
Dover,O. G6 .....6.85*
Riverdale,Ill. A1 .....6.95*
Warren,O. B9, T5 ....6.85*
Worcester,Mass. A7 ....7.40*
Youngstown C8 .....6.95*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.975

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.40
Riverdale,Ill. A1 .....5.25
Sharon,Pa. S3 .....5.10
Youngstown U5 .....5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol,Conn. W1	...	10.40	12.60	15.60	18.55
Carnegie,Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	...	*10.10*	*12.30*	*15.30*	*18.25*
Dover,O. G6	8.65	10.10	12.30	15.30	18.25
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
FranklinPark,Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison,N.J. C18	....	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
LosAngeles C1	10.85	12.30	14.50	....	....
NewBritain,Conn.(10) S15, *NewCastle,Pa. B4, E5*	8.65	10.10	12.30	15.30	18.25
	8.65	*10.10*	*12.30*	*15.30*	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	...	10.40	12.60	15.60	18.55
Pawtucket,R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale,Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome,N.Y.(32) R6	8.65	10.10	12.30	15.30	18.25
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	10.40	12.60	15.60	18.55
Wallingford,Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren,O. T5	8.65	10.10	12.30	15.30	18.25
Worcester,Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	17.10	20.95	25.30
Buffalo W12	...	...	*17.10*	....	....
FranklinPark,Ill. T6	...	...	17.15	21.00	25.35
Harrison,N.J. C18	...	...	17.10	20.95	25.30
NewYork W3	...	...	17.10	20.95	25.30
Palmer,Mass. W12	...	...	*17.10*	....	....
Trenton,N.J. R5	...	...	17.10	20.95	25.30
Worcester,Mass. A7, T6	...	...	17.10	20.95	25.30
Youngstown C8	...	...	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10..	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
IndianaHarbor,Ind. I-2...	9.20†	10.35*	11.025*†	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*†	13.05*†
Vandergrift,Pa. U5	....	10.85†	11.525†‡	12.575†‡	13.55†‡
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	7.825	....
Niles,O. R2	7.425	7.825	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5..	$9.70	$9.95
Fairfield,Ala. T2 ..	9.80	10.05
Fairless,Pa. U5 ..	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11..	10.45	10.70
Sp.Pt.,Md. B2 ...	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10.	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1..	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHEET TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ...7.20
Aliquippa,Pa. J5 .....7.20
Alton,Ill. L1 .....7.40
Atlanta A11 .....7.20
Bartonville,Ill. K4 .....7.30
Buffalo W12 .....7.20
Chicago W13 .....7.20
Cleveland A7, C20 .....7.20
Crawfordsville,Ind. M8..7.30
Donora,Pa. A7 .....7.20
Duluth A7 .....7.20
Fairfield,Ala. T2 .....7.20
Fostoria,O.(24) S1 .....7.30
Houston S5 .....7.45
Jacksonville,Fla. M8 ...7.55
Johnstown,Pa. B2 .....7.20
Joliet,Ill. A7 .....7.20
KansasCity,Mo. S5 .....7.45
Kokomo,Ind. C16 .....7.30
LosAngeles B3 .....8.15
Minnequa,Colo. C10 ....7.45
Monessen,Pa. P7, P16..7.20
N.Tonawanda,N.Y. B11..7.20
Palmer,Mass. W12 .....7.50
Pittsburg,Calif. C11 ...8.15
Portsmouth,O. P12 .....7.20
Rankin,Pa. A7 .....7.20
S.Chicago,Ill. R2 .....7.20
S.SanFrancisco C10 ....8.15
SparrowsPoint,Md. B2 ..7.30
Sterling,Ill.(1) N15 ....7.30
Sterling,Ill. N15 .....7.30
Struthers,O. Y1 .....7.20
Waukegan,Ill. A7 .....7.20
Worcester,Mass. A7 ....7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 .....11.90
Buffalo W12 .....11.90
Cleveland A7 .....11.90
Donora,Pa. A7 .....11.90
Duluth A7 .....11.90
Johnstown,Pa. B2 .....11.90
Minnequa,Colo. C10 ...12.025
Monessen,Pa. P16 .....11.90
Muncie,Ind. I-7 .....12.10
NewHaven,Conn. A7 ...12.20
Palmer,Mass. W12 .....12.20
Pittsburg,Calif. C11 ....12.70
Portsmouth,O. P12 ....11.90
Roebling,N.J. R5 .....12.20
SparrowsPt.,Md. B2 ...12.00
Struthers,O. Y1 .....11.75
Trenton,N.J. A7 .....12.20
Waukegan,Ill. A7 .....11.90
Worcester,Mass. A7 ...12.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....8.70
Alton,Ill. L1 .....8.60
Buffalo W12 .....8.70
Cleveland A7 .....8.70
Donora,Pa. A7 .....8.70
Duluth A7 .....8.70
Johnstown,Pa. B2 .....8.70
KansasCity,Mo. S5 .....8.65
LosAngeles B3 .....9.65
Minnequa,Colo. C10 .....8.90
Monessen,Pa. P7, P16 ..8.70
NewHaven,Conn. A7 ...9.00
Palmer,Mass. W12 .....9.00
Pittsburg,Calif. C11 .....9.65
Portsmouth,O. P12 .....8.70
Roebling,N.J. R5 .....8.70
S.Chicago,Ill. R2 .....8.70
S.SanFrancisco C10 ....9.35
SparrowsPt.,Md. B2 ....8.80
Struthers,O. Y1 .....8.40
Trenton,N.J. A7 .....9.00
Waukegan,Ill. A7 .....8.70
Worcester,Mass. A7 ....9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.025
Alton,Ill. L1 .....8.925
Bartonville,Ill. K4 .....9.125
Buffalo W12 .....9.025
Cleveland A7 .....9.025
Donora,Pa. A7 .....9.025
Duluth A7 .....9.025
Fostoria,O. S1 .....8.775
Johnstown,Pa. B2 .....9.025
LosAngeles B3 .....9.975
Milbury,Mass.(12) N6..9.325
Minnequa,Colo. C10 ....9.275
Monessen,Pa. P7, P16..9.025
Muncie,Ind. I-7 .....9.225
Palmer,Mass. W12 .....9.325
Pittsburg,Calif. C11 ....9.975
Portsmouth,O. P12 ....9.025
Roebling,N.J. R5 .....9.025
S.Chicago,Ill. R2 .....9.025
S.SanFrancisco C10 ...9.675
SparrowsPt.,Md. B2 ...9.125
Struthers,O. Y1 .....8.725
Trenton,N.J. A7 .....9.325
Waukegan,Ill. A7 .....9.025
Worcester J4, T6, W12..9.025
Worcester,Mass. A7 ...9.325

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....14.35
Bartonville,Ill. K4 .....14.25
Buffalo W12 .....14.45
Chicago W13 .....14.15
Cleveland A7 .....14.15
Crawfordsville,Ind. M8..14.25
Fostoria,O. S1 .....14.15
Jacksonville,Fla. M8 ..14.50
Johnstown,Pa. B2 .....14.15
Kokomo,Ind. C16 .....14.15
Minnequa,Colo. C10 ...13.90
Monessen,Pa. P6 .....14.20
Muncie,Ind. I-7 .....14.35
Palmer,Mass. W12 .....14.75
Roebling,N.J. C10 ....14.45
S.SanFrancisco C10 ...14.50
Waukegan,Ill. A7 .....14.15
Worcester,Mass. A7, T6 14.45

ROPE WIRE (A)

Bartonville,Ill. K4 .....12.00
Buffalo W12 .....12.00
Fostoria,O. S1 .....11.55
Johnstown,Pa. B2 .....11.55
Monessen,Pa. P7 .....11.55
Muncie,Ind. I-7 .....11.75
Palmer,Mass. W12 .....12.30
Portsmouth,O. P12 ....12.00
Roebling,N.J. R5 .....12.30
SparrowsPt.,Md. B2 ....11.85
Struthers,O. Y1 .....11.55
Worcester,Mass. J4 ....11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	*15.75*
Monessen,Pa. P16	15.45
Roebling,N.J. R5	*16.10*

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES, Stock / Col.

AlabamaCity,Ala. R2	164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla. (20) M8	175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (7) N15	166
Worcester,Mass. A7	170

NAILS, Stock / Col.

Chicago W13	164
Cleveland A9	170

(To Wholessalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(For 97 lb Hot Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	9.63
Buffalo W12	*9.93*
Chicago W13	9.53
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.53
Duluth A7	9.53
Fairfield,Ala. T2	9.53
Houston S5	9.78
Jack'ville,Fla. M8	10.09
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill. (37)N15	9.63

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	*10.25*
Chicago W13	9.85
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	9.85
Duluth A7	9.85
Fairfield,Ala. T2	9.85
Houston S5	10.10
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	9.95
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill. (37) N15	9.95

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville Ill. K4	10.00
Buffalo W12	*10.30*
Chicago W13	9.90
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	9.90
Duluth A7	9.90
Fairfield,Ala. T2	9.91
Houston S5	10.15
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(37) N15	10.00

BALE TIES, Single Loop / Col.

AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill. (7) N15	192
SparrowsPoint,Md. B2	192
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

WIRE, Barbed / Col.

AlabamaCity,Ala. R2	184**
AliquippaPa. J5	181§
Atlanta A11	190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	190
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	188*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	190*

WOVEN FENCE, 9-15 Ga. / Col.

Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	179§
Atlanta A11	182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	180*
Pittsburgh,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(7) N15	182*

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	15.70	17.50
Bartonville K4	15.80	17.75
Buffalo W12	16.10	....
Cleveland A7	*16.00*	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50**
Jacksonville M8	16.05	18.00
Johnstown B2	15.70	17.65*
Kan.City,Mo. S5	15.95	....
Kokomo C16	15.80	17.35†
Minnequa C10	16.05	17.75**
P'lm'r,Mass.W12	*16.30*	*17.85†*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	15.80	17.75*
Sterling(37) N15	15.80	17.75*
Waukegan A7	*16.00*	*17.55†*
Worcester A7	*16.30*	....

WIRE, Merchant Quality (6 to 8 gage) / An'ld Galv.

Ala. City,Ala. R2	7.95 8.35**
Aliquippa J5	7.95 8.475§
Atlanta (48) A11	8.05 8.65*
Bartonville(48) K4	8.05 8.65
Buffalo W12	*8.20 8.75†*
Cleveland A7	*8.20* ....
Crawfordsville M8	8.05 8.65
Donora,Pa. A7	*8.20 8.75†*
Duluth A7	*8.20 8.75†*
Fairfield T2	*8.20 8.75†*
Houston(48) S5	8.20 8.60**
Jacks'ville,Fla. M8	8.30 8.90
Johnstown B2(48)	7.95 8.55*
Joliet,Ill. A7	*8.20 8.75†*
Kans.City(48) S5	8.20 8.60**
Kokomo C16	8.05 8.45†
LosAngeles B3	8.90 9.50*
Minnequa C10	8.20 8.60**
Monessen P7 (48)	7.95 8.55*
Palmer,Mass. W12	*8.50 9.05†*
Pitts.,Calif. C11	*9.15 9.70†*
Rankin,Pa. A7	*8.20 8.75†*
S.Chicago R2	7.95 8.35**
S.SanFran. C10	8.90 9.30**
Spar'wsPt. B2(48)	8.05 8.65*
Sterling(37)(48)N15	8.05 8.65*
Struth'rs,O.(48)Y1	7.95 8.45‡
Worcester,Mass. A7	*8.50 9.05†*

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	*52.5*
Longer than 6 in.	*43.5*
⅝ in. thru 1 in.:	
6 in. and shorter	*43.5*
Longer than 6 in.	*41.5*
1⅛ in. and larger:	
All lengths	*41.5*

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	*52.5*

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	*32.0*
Longer than 6 in.	*19.0*
⅝ in. thru 1 in.:	
6 in. and shorter	*16.0*
Longer than 6 in.	*16.0*
1⅛ in. and larger:	
All lengths	*16.0*

Lag Bolts

All diameters:	
6 in. and shorter	*52.5*
Longer than 6 in.	*44.5*

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	*52.0*
Larger than ½ in. or longer than 6 in.	*44.5*
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0

Stove Bolts, Slotted

¼ to ¼-in., incl., 3 in. and shorter	54.00
⅜ to ½-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:

All sizes	*58.0*

Square Nuts, Reg. &

Heavy, Hot Galvanized:

All sizes	*44.0*

Hex Nuts, Reg. & Heavy, Hot Pressed:

¼ in. and smaller	*61.5*
⅞ in. to 1 in., incl.	*57.5*
1⅛ in. to 1½ in., incl.	*62.5*
1¾ in. and larger	*56.0*

Hex Nuts, Reg &

Heavy, Cold Punched:

¼ in. and smaller	*61.5*
⅞ in. to 1½ in., incl.	*57.5*
1¾ in. and larger	*56.0*

Hex Nuts, All Types, Hot Galvanized:

¼ in. and smaller	*48.0*
⅞ in. to 1 in. incl.	*44.0*
1⅛ in. to 1½ in., incl.	49.0

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¼ in. and smaller	*61.5*
⅞ in. to 1½ in., incl.	*57.5*
1¾ in. and larger	*56.0*

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	*64.00*
1⅛ in. to 1½ in., incl.	60.5
1¾ in. and larger	56.0

CAP AND SET SCREWS (Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread,

Bright:

6 in. and shorter:	
¼ in. and smaller	*44.0*
⅝, ⅞ and 1 in. diam.	*27.0*
Longer than 6 in.:	
¼ in. and smaller	*14.0*
⅝, ⅞ and 1 in. diam.	*0.5*

High Carbon, Heat Treated:

6 in. and shorter:	
¼ in. and smaller	*31.0*
⅝, ⅞ and 1 in. diam.	*9.0*
Longer than 6 in.:	
¼ in. and smaller	*+6*
⅝, ⅞ and 1 in. diam.	*+24*

Flat Head Cap Screws:

¾ in. and smaller	+65.0

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 11.50 7/8-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1¾	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2¼	13	40.93	47.94	37.42
2½	12	44.42	52.03	40.61
2¾	12	48.94	57.31	44.73
3	12	52.99	62.05	48.44
3	13	56.51	66.18	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	....
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	....
Johnstown,Pa. B2	....	....	...(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.175
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.10
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2,Y1	9.225
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.275
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.143 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(22) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone,5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) 8Scared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c. for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(45) 6-7 Ga.
(46) 2½-in. and smaller rounds; 8.85c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10 25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					35.50
302	....	....	....	....	37.75
304	33.15	36.20	40.30	44.50	....
304-L	35.40	38.80	43.15	47.65	55.50
316	38.35	41.60	45.90	50.15	....
316-L	43.55	47.40	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	44.75
321	34.90	37.95	42.10	46.40	54.25
347	37.05	41.25	46.45	51.70	....
405	27.55	29.20	32.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1	*64.50*	*65.00*	*65.50*	*66.00*
Buffalo R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9		*65.00*	*65.50*	*66.00*
Boston, deld.	*75.79*	*76.29*	*76.79*	....
Rochester,N.Y., deld.	*67.52*	*68.02*	*68.52*	....
Syracuse,N.Y., deld.	*68.62*	*69.12*	*69.62*	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	*64.50*	*65.00*	*65.00*	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	*66.96*	*67.46*	*67.46*	*67.96*
Muskegon,Mich., deld.	....	*78.83*	*78.83*	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	*66.50*	*67.00*	*67.50*	
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.95
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1		....	*65.00*	
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1		....	*65.00*	*65.50*
Mansfield,O., deld.	*69.40*	....	*69.90*	*70.40*
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	64.50	65.00	65.50	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	*66.40*	*66.90*	*67.40*	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extras; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	*78.50*

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, H.O. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	*$78.50*
Rockwood,Tenn. T3 (Phos. 0.035% max)	*78.50*
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	*69.50*

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.§	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.17‖	9.37‖	9.83‖	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	....	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	....	....	8.44	8.40	10.26
Chicago	7.80	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	10.54	15.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.70	9.65	10.99	....	8.80	9.15	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	....	....	8.54	8.50	10.34
Los Angeles	9.10	10.80	11.65	....	9.15	9.05	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.71	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	8.07	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	55.20	11.05‡‡	9.45	13.55	14.60	9.35	12.20§§	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.43	8.28	8.96	14.41	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	9.21	....	8.94	8.90	9.87
San Francisco	8.95	10.30	10.80	53.45	8.95	9.05	12.30	15.35	9.05	9.20	11.45
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.30
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.55	13.30	16.40	9.35	9.30	11.75
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10 000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

(Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian Iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$24.00-26.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	26.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	50.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	35.80-45.00†
Bronze, 5000-lb lots	44.70-59.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	54.70-66.40†
Phosphor-Copper, 5000-lb lots	64.00
Copper (atomized) 5000-lb lots	46.50-54.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over	4.20
Less than 1000 lb.	4.35
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.50	7.50	7.50	7.75
Channels	7.70	7.70	7.70	7.95
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.90	6.90	6.90	7.35
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.57

Oil Country Pipe: Mills withdrawn temporarily.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

(*Concluded from page* 182)

is affected by the strike at the Wickwire Spencer mill where two blast furnaces have been shut down. Other mills in the area have made no changes in operations.

February Steel Output Heavy

February production of ingots and steel for castings was at a record daily basis for that month, but the 9,987,000-ton total was slightly lower than that of February, 1956, which had one more day, reports the American Iron & Steel Institute.

The February daily average was 356,679 net tons, against 348,931 in the like month last year when output was 10,118,995 tons. It also was slightly greater than the 355,121-ton average for January, this year, when the total was 11,008,762 tons.

Total production for the first two months of this year was a record 20,995,762 net tons, or about 48,000 tons above output in the like period of 1956.

Steelmaking furnaces operated at 97.5 per cent of capacity in February, based on Jan. 1 capacity of 133,459,150 net tons. In January, the rate averaged 97.1 per cent.

The index of steel produced (based on average output 1947-1948-1949 as 100) was 155.4 during February, 154.7 in January and 152.1 in February last year.

Structural Shapes . . .

Structural Shape Prices, Page 185

Orders for structural steel are somewhat scattered, though considerable tonnage is on inquiry in the market—or at least is in the active planning stage. Outstanding are highway projects, schools and other public jobs. A little power plant construction is being figured.

While there may be some easing in supplies of standard sections before the second quarter ends, supplies will still be far from plentiful. In wide flange shapes, no softening is anticipated before late in the third quarter, if then.

In New England, a slight supply improvement is confined to the smaller standard sizes, j u n i o r beams and bar shapes. More tonnage in this category is being offered area fabricators, including rollings by a Pittsburgh mill now equalizing on delivered prices with Bethlehem. This mill has sold little structural material in the area until recently.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8000 tons, bridge superstructure, Milwaukee railroad, Bensenville yards, Chicago, to the American Bridge Division, U.S. Steel Corp., Pittsburgh, through the Illinois State Toll Highway Commission.

4095 tons, office building, Murchison Tower, Denver, Colo., to the American Bridge Division, U.S. Steel Corp., Pittsburgh; Mead & Mount Construction Co., Denver, general contractor.

3160 tons, superstructure, three bridges, Tri-State and East-West tollway, to the Allied Structural Steel Co., Chicago, through the Illinois State Toll Highway Commission.

3105 tons, six bridges, girders and beams, Illinois Toll Highway Commission, Chicago, to the American Bridge Division, U.S. Steel Corp., Pittsburgh; bids direct.

1680 tons, six bridges, Des Plaines, Ill., to the American Bridge Division, U.S. Steel Corp., Pittsburgh, through the Illinois State Toll Highway Commission.

1650 tons, four contracts, direct bids, structures, Grand Forks, Minot and Ellsworth AFB, to the Capitol Steel & Iron Co., Oklahoma City, Okla., through the Corps of Engineers, Omaha, Nebr.

1470 tons, state highway bridges, Jackson, Muskegon and Wayne counties, Mich., to the Bethlehem Steel Co., Bethlehem, Pa.

1080 tons, distribution center, Western Electric Co., Arlington, Va., to the Southern Iron Works, Baltimore; Baltimore Contractors Inc., general contractor.

455 tons, bridge, US-23 relocation over the Raisin river, Dundee, Mich., to the R. C. Mahon Co., Detroit.

475 tons, stadium, Florida A. & M. University, Tallahassee, Fla., to the Bushnell Steel Co., Jacksonville, Fla.

300 tons, testing bulkhead unit, Boeing Airplane Co., Seattle, to the Pacific Car & Foundry Co., Seattle.

315 tons, state highway bridge, Waterbury, Conn., to the Bethlehem Steel Co., Bethlehem, Pa.; Stanley J. Ziobro, Seymour, Conn., general contractor.

STRUCTURAL STEEL PENDING

1225 tons, nine grade separation structures, Connecticut turnpike, Old Lyme-East Lyme and Waterford, Conn.; L. G. DeFelice & Son Inc., North Haven, Conn., low on general contract, $4,876,543; also 715 tons, reinforcing bars; 665 tons, mat reinforcement; 600 tons, steel piles.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1535 tons, office building, Murchison Tower, Denver, to the Colorado Builders' Supply Co., Denver (1413 tons) and the Kansas City Construction Supply Co. (122 tons); Mead & Mount Construction Co., Denver, general contractor.

1085 tons, three 11-story dormitories, Ohio State University, Columbus, O., to Poliak Steel Co., Cincinnati; Garwick & Ross Inc., Columbus, general contractor; 75 tons, structurals, J. T. Edwards Co., Columbus.

950 tons, three state bridges, Southeast expressway, Boston, to Northern Steel Inc., Medford, Mass.; Coleman Bros. Corp., Readville, Mass., general contractor; 2000 tons, steel piling, Bethlehem Steel Co., Bethlehem, Pa.

900 tons, quarters and barracks, U.S. Naval Minecraft Base, Charleston, S. C., to Atlantic Steel Co., Atlanta; McDonough Construction Co., Atlanta, general contractor.

800 tons, distribution center, Western Electric Co., Arlington, Va., to the Fabricators Steel Co., Baltimore; Baltimore Contractors Inc., Baltimore, general contractor.

655 tons, office building, Federal Reserve Bank, Nashville, Tenn., to the Connors Steel Division, H. K. Porter Company Inc., Birmingham; Southeastern Construction Co., Charlotte, N. C., general contractor; 65 tons, structurals, Standard Wire & Iron Works, Chattanooga, Tenn.

REINFORCING BARS PENDING

4000 tons, four apartments, Triangle Development Co., 22nd and the Parkway, Philadelphia, Knickerbocker Construction Co., New York, low on the general contract.

820 tons, 4.519 miles, Edens spur to Tri-State route, Northern Illinois toll highway contract T-11 B, including erection of precast concrete bridges, Northfield township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Mar. 28.

740 tons, structures, Norfolk approach, and Newport News connector highways; bids Mar. 27, State Department of Highways, Richmond, Va.

RAILS, CARS . . .

RAILROAD CARS PENDING

Alaska Railroad, fifty 70-ton all-steel hopper cars, for coal service; bids to General Services Administration, Seattle, Mar. 25.

Steel Ingot Production—February, 1957

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1957								
*January	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
†February	8,898,000	99.2	278,000	80.4	811,000	87.8	9,987,000	97.5
1956								
January	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February	9,041,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr.	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,585,944	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr.	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo.	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr.	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr.	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2d 6 Mo.	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,606,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

*Revised. †Preliminary figures subject to revision.

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Scrap Downtrend Still Unchecked

Index on steelmaking grades falls another $1.34 to $50.33 as the mills continue to limit purchases. Decline in steelmaking operations is unsettling market factor

Scrap Prices, Page 196

Philadelphia — Prices have declined further. Prime grades of open-hearth material are off $2 on sales at $54, delivered. No. 2 heavy melting is lower at $45-$45.50, delivered, and No. 2 bundles at $43-$43.50. The easing reflects fair scrap inventories at the mills and the approach of spring. Milder weather should stimulate the flow of material to dealers' yards.

Electric furnace bundles are lower at $57, delivered; mixed borings and turnings, $43; short shoveling turnings, $45; machine shop turnings, $40-$41; heavy turnings, $50. Low phos structurals and plate are easier at $58-$59, delivered; couplers, springs and wheels are nominally $64-$66; and rail crops (2 ft and under) $76.

Major cast iron grades are moving at lower prices. No. 1 cupola is $51, delivered; heavy breakable, $57-$58; malleable, $64, nominal; drop broken machinery, $57-$58.

New York—Despite a freer flow of scrap for export, now that the tugboat operators' strike is over, scrap prices have declined sharply. Reasons: Further easing in steel production and prospects of better collections of yard material with spring at hand.

No. 1 heavy melting steel and No. 1 bundles are off $3 a ton to $47-$48. Brokers have also dropped their buying prices $3 on No. 2 heavy melting to $38-$39, and $1 a ton on No. 2 bundles to $36-$37.

Machine shop turnings are off $1 to $30-$31, and mixed borings and turnings are lower at $31-$32. Short shoveling turnings have been marked down $2 to $34-$35. Low phos structurals and plate are unchanged at $55-$56.

The cast iron grades are easier at $44-$45 for No. 1 cupola, $34-$35 for unstripped motor blocks, and $46-$47 for heavy breakable.

Stainless steel scrap prices have dropped appreciably. This is ascribed largely to a building up of consumer inventories, a decline in consumer needs and an easier supply of nickel. Brokers are now offering $440-$450 for 18-8 sheets, clips and solids, $330-$340 for 18-8 borings and turnings. Offering prices on 430 and 140 types of sheets, clips and solids have dropped $10 a ton to $95-$100 and $85-$90.

Pittsburgh — The scrap market here is weak. A major steelmaker is reported planning a purchase of open-hearth grades at "substantially lower prices." Users of stainless scrap are out of the market

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waiting a reduction in prices. Stainless scrap is already dropping from its heights of late 1956.

Although there were no major buys of No. 1 heavy melting scrap the last week, market sources agree a downtrend is continuing. Electric furnace bundles and cut structurals have declined $2 a ton.

Chicago—No. 1 heavy melting steel scrap is off another $1 a ton after having held steady for four weeks. Material of industrial origin has been purchased by a mill for $49, and dealer material for $45. Other open-hearth grades and blast furnace items are steady. Foundry grades are down $1 to $3 a ton. Several railroad items are lower by $2.

The market is soft and without indication that the decline which dates back to December is at an end. It is fairly clear, though, that the downward trend has leveled off. Contributing to the weak market is the fact that the steel mills have substantial inventories of scrap, and steelmaking operations are slipping.

Cleveland — Except for a mill purchase of No. 2 bundles at $37, delivered, the scrap market here and in the Valley is devoid of activity. Brokers and dealers anticipate a further decline in prices with the steel ingot rate continuing to slip. For the moment prices throughout the list are unchanged. No. 1 heavy melting is quoted here at $45-$46, and in the Valley at $48-$49. These prices are nominal, largely reflecting brokers' views in the absence of mill buying.

Youngstown—The scrap market here hit the skids again recently, with one large steel producer placing substantial tonnage orders for No. 2 heavy melting at $46, and No. 2 bundles at $42. Another mill bought industrial No. 1 grade at $52.75. These prices represent a decline of $4 on No. 2 heavy melting, and $3 on No. 2 bundles.

Detroit—Scrap prices are unchanged here, but they are soft. No. 2 heavy melting has slipped off a bit, but no buys have been made in the area lately. Brokers and dealers indicate the market may be feeling its way toward a plateau.

Buffalo — A leading consumer bought No. 1 heavy melting at $49, No. 2 heavy melting at $43 and No. 2 bundles at $40. These prices represent declines of $3 to $5 a ton from those paid by the same buyer in February.

With new contracts covering shipments for March, the local market appears fairly well stabilized.

Low phos scrap has been marked down to $52, off $2 a ton.

(*Please turn to page* 201)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Mar. 6, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 13	$50.33
Mar. 6	51.67
Feb. Avg.	53.41
Mar. 1956	50.21
Mar. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*50.00-51.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*50.00-51.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*50.00-51.00*
Machine shop turnings	36.00-37.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	40.00-41.00
Cast iron borings	40.00-41.00
Cut structurals, 3 ft. lengths	*54.00-55.00*
Cut structurals, 2 ft. and under	*56.00-57.00*
Heavy turnings	45.00-46.00
Punchings & plate scrap	*54.00-55.00*
Electric furnace bundles	*54.00-55.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	47.00-48.00
Unstripped motor blocks	38.00-39.00
No. 1 machinery cast	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	55.00-56.00
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	*68.00-69.00*
Railroad specialties	67.00-68.00

Stainless Steel Scrap

18-8 bundles & solids	*460.00-500.00*
18-8 turnings	*360.00-400.00*
430 bundles & solids	*100.00-110.00*
430 turnings	*75.00-80.00*

CLEVELAND

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	29.00-30.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	32.00-33.00
Cast iron borings	32.00-33.00
Cut foundry steel	51.00-52.00
Cut structurals, plates 2 ft and under	55.00-56.00
Alloy free, short shovel turnings	36.00-37.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	52.00-53.00
Charging box cast	41.00-42.00
Heavy breakable cast	41.00-42.00
Stove plate	48.00-49.00
Unstripped motor blocks	34.00-35.00
Brake shoes	41.00-42.00
Clean auto cast	51.00-52.00
Burnt cast	39.00-40.00
Drop broken machinery	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
R.R. malleable	57.00-58.00
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	65.00-66.00
Cast steel	59.00-60.00
Railroad specialties	63.00-64.00
Uncut tires	62.00-63.00
Angles, splice bars	62.00-63.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-475.00
18-8 turnings	290.00-300.00
430 clips, bunndles, solids	85.00-90.00
430 turnings	35.00-40.00

YOUNGSTOWN

No. 1 heavy melting	48.00-49.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	48.00-49.00
No. 2 bundles	40.00-41.00
No. 1 busheling	48.00-49.00
Machine shop turnings	28.00-29.00
Short shovel turnings	32.00-33.00
Cast iron borings	32.00-33.00
Low phos.	50.00-51.00
Electric furnace bundles	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00

CHICAGO

No. 1 hvy melt, indus.	*48.00-49.00*
No. 1 hvy melt, dealer	*44.00-45.00*
No. 2 heavy melting	*41.00-42.00*
No. 1 factory bundles	50.00-51.00
No. 1 dealer bundles	46.00-47.00
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	*48.00-49.00*
No. 1 busheling, dealer	*44.00-45.00*
Machine shop turnings	33.00-34.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft	*51.00-52.00*
Punchings & plate scrap	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	41.00-42.00
Unstripped motor blocks	*33.00-34.00*
Clean auto cast	*49.00-50.00*
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	*62.00-63.00*
Rails, 18 in. and under	*63.00-64.00*
Angles, splice bars	57.00-58.00
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles & solids	500.00-510.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.ob. shipping point)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	42.00-43.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
Machine shop turnings	26.00-28.00
Mixed borings, turnings	27.00-29.00
Short shovel turnings	28.00-29.00
Punchings & plate scrap	54.00-55.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	43.00
Stove plate	45.00
Heavy breakable	41.00
Unstripped motor blocks	29.00
Clean auto cast	52.00
Malleable	53.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	45.50
No. 2 heavy melting	43.00
No. 1 bundles	45.50
No. 2 bundles	37.00
No. 1 busheling	45.50
Machine shop turnings	34.50
Short shovel turnings	36.50

Cast Iron Grades

No. 1 cupola	45.50
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	45.00
Clean auto cast	49.50
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	52.00
Rails, 18 in. and under	64.00
Rails, rerolling	63.00
Rails, random lengths	57.00
Angles, splice bars	62.00

PHILADELPHIA

No. 1 heavy melting	*54.00*
No. 2 heavy melting	*45.00-45.50*
No. 1 bundles	*54.00*
No. 2 bundles	*43.00-43.50*
No. 1 busheling	*54.00*
Electric furnace bundles	*57.00*
Mixed borings, turnings	*43.00*
Short shovel turnings	*45.00*
Machine shop turnings	*40.00-41.00*
Heavy turnings	*50.00*
Structurals & plate	*58.00-59.00*
Couplers, springs, wheels	*64.00-66.00*
Rail crops, 2 ft & under	*76.00*

Cast Iron Grades

No. 1 cupola	*51.00*
Heavy breakable cast	*57.00-58.00*
Malleable	*64.00†*
Drop broken machinery	*57.00-58.00*

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*36.00-37.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*34.00-35.00*
Low phos. (structurals & plate)	55.00-56.00

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Unstripped motor blocks	*34.00-35.00*
Heavy breakable	*46.00-47.00*

Stainless Steel

18-8 sheets, clips solids	*440.00-450.00*
18-8 borings, turnings	*330.00-340.00*
430 sheets, clips, solids	*95.00-100.00*
410 sheets, clips, solids	*85.00-90.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	46.00-46.50
No. 2 heavy melting	36.00-36.50
No. 1 bundles	46.00-46.50
No. 2 bundles	34.00-35.00
No. 1 busheling	46.00-46.50
Machine shop turnings	30.00-30.50
Mixed borings, turnings	31.00-32.00
Short shovel turnings	32.00-33.00
No. 1 cast	41.00-42.00
Mixed cupola cast	40.00-41.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	39.00-40.00
No. 1 busheling	*48.00-49.00*
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	*51.00-52.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	59.00-60.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	54.00-55.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*44.50-45.50*
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	*44.50-45.50*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*44.50-45.50*
Machine Shop turnings	*31.50-32.50*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*34.00-35.00*
Cast iron borings	*31.00-32.00*
Low phos. 18 in.	54.00-55.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Heavy breakable cast	*46.00-47.00*
Charging box cast	*46.00-47.00*
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*57.00-58.00*

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	42.00-43.00
No. 2 bundles	*28.00-29.00*
No. 1 busheling	42.00-43.00
Cast iron borings	26.00-27.00
Short shovel turnings	36.00-37.00
Machine shop turnings	34.00-35.00
Bar crops and plate	*52.00-53.00*
Structurals & plate	*51.00-52.00*
Electric furnace bundles	*48.00-49.00*
Electric furnace, 2 ft & under	48.00-49.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Stove plate	50.00-51.00
Unstripped motor blocks	41.00-42.00
Charging box cast	40.00-41.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00-49.00*
Rails, 18-in. and under	*59.00-60.00*
Rails, rerolling	62.00-63.00
Rails, random lengths	*56.00-57.00*
Angles, splice bars	*57.00-58.00*

SEATTLE

No. 1 heavy melting	53.00
No. 2 heavy melting	48.00
No. 1 bundles	48.00
No. 2 bundles	30.00-32.00
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	52.00-54.00
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	40.00-42.00
Stove plate (f.o.b. plant)	42.00-43.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	51.00
No. 1 bundles	54.00
No. 2 bundles	36.00
Machine shop turnings	*36.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	50.00
No. 1 bundles	54.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	*57.00*
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	*57.00*
No. 1 wheels	50.00
Drop broken machinery	*57.00*

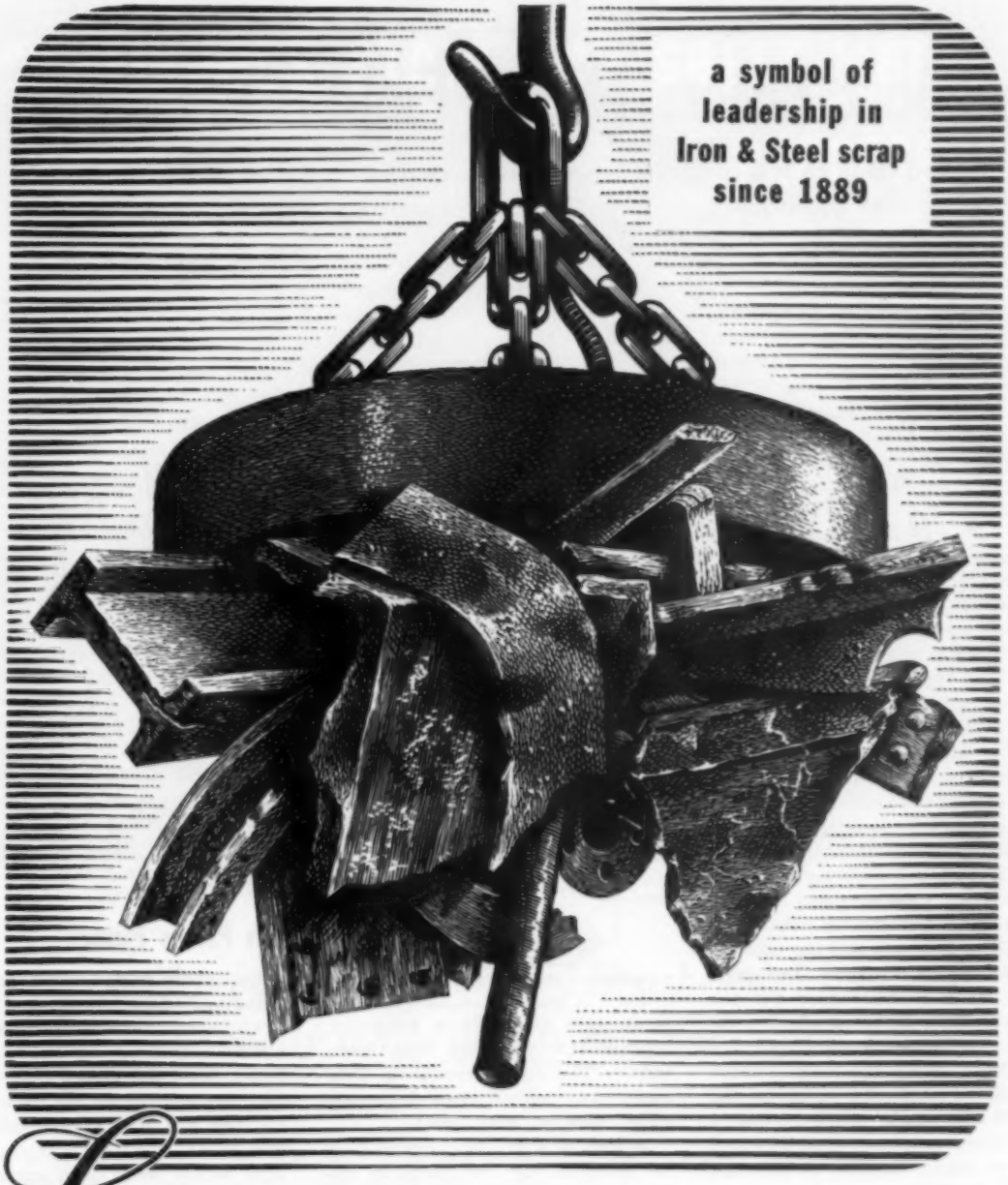
HAMILTON, ONT.

No. 1 heavy melting	48.00
No. 2 heavy melting	43.00
No. 1 bundles	48.00
No. 2 bundles	37.00
Mixed steel scrap	40.00
Mixed borings, turnings	24.00
Busheling, new factory: Prepared	46.00
Unprepared	42.00
Short steel turnings	33.00
Rails, rerolling	*54.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



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Freeport Enters Nickel Field

Long looked upon as the company most likely to develop a new Cuban nickel producing facility, Freeport Sulphur Co. has made the plunge. It has a U.S. contract

Nonferrous Metal Prices, Pages 200 & 201

THE General Services Administration has signed an agreement with Freeport Sulphur Co. to purchase 135,500 tons of nickel and 11,918 tons of cobalt by June 30, 1965.

Freeport's subsidiary, Cuban American Nickel Co., hopes to produce some 25,000 tons of nickel and 2200 tons of cobalt annually. The U.S. will have first call on at least 30 per cent of the nickel production.

Where—Most of the operations will be carried out in Cuba (at Moa bay on the northeastern coast). They will include mining ores and processing them into nickel and cobalt concentrates. Concentrates will be shipped to a refining plant which will be built in the U.S., probably on the Gulf Coast.

The ores will be beneficiated by a new process which has been in "pilot stage." Observers estimate that Freeport has already spent some $80 million developing its Cuban holdings and the process.

Nicaro? — Freeport has been listed as a prime bidder for the government's nickel producing facility in Cuba (STEEL, Mar. 11, p. 252). With the U.S. Nicaro operations producing at about the 25,000-ton mark, some industry spokesmen point out that Freeport may be taking this step to entrench itself in Cuba. Result: Freeport could bid for the Nicaro property when it's put up for sale on the basis that Freeport already has other operations under way.

Thought on Stockpiling

Speaking before the Secondary Metal Institute, Simond D. Strauss, vice president, American Smelting & Refining Co., reported: "If government support is withdrawn from zinc, substantial surpluses could develop unless business activity rises well above current levels . . . The lead market is considered to be in basically sound position and should be able to adjust with reasonable promptness in the event government purchases stop."

Zinc Production Dips

Owing to a short month, zinc production dipped from 93,452 tons in January to 87,974 in February, reports the American Zinc Institute. The daily average in February was higher than January's (3142 tons vs. 3014 tons).

A sign of a gradual upturn may be indicated by the jump in unfilled orders. Totals rose from 42,922 at the end of January to 56,421 at the beginning of March. Deliveries to government stockpile were reduced about one-third—from 15,377 tons in January to 10,905 tons in February.

Source: Magnesium Association.

Mag Sets Record

January magnesium production reached 7111 tons, an all-time peacetime record. This total topped December production by 26 tons. Last year's January production was 6337 tons.

Copper Sales So-So

"We can't complain, but we can't be optimistic," explains one copper sales manager. Primary producers report that domestic demand for March has just about equaled (in some cases slightly bettered) February bookings. U.S. producers willing to sell on the average price of the London Metal Exchange (about 30 cents a pound) are finding that foreign demand is reasonably good. The problem: The LME average is about 2 cents a pound lower than primary producers' domestic quotation.

Tin Prices Firmer

Tin prices, slated for a gradual reduction, have become firmer. Reason: Middle East tension.

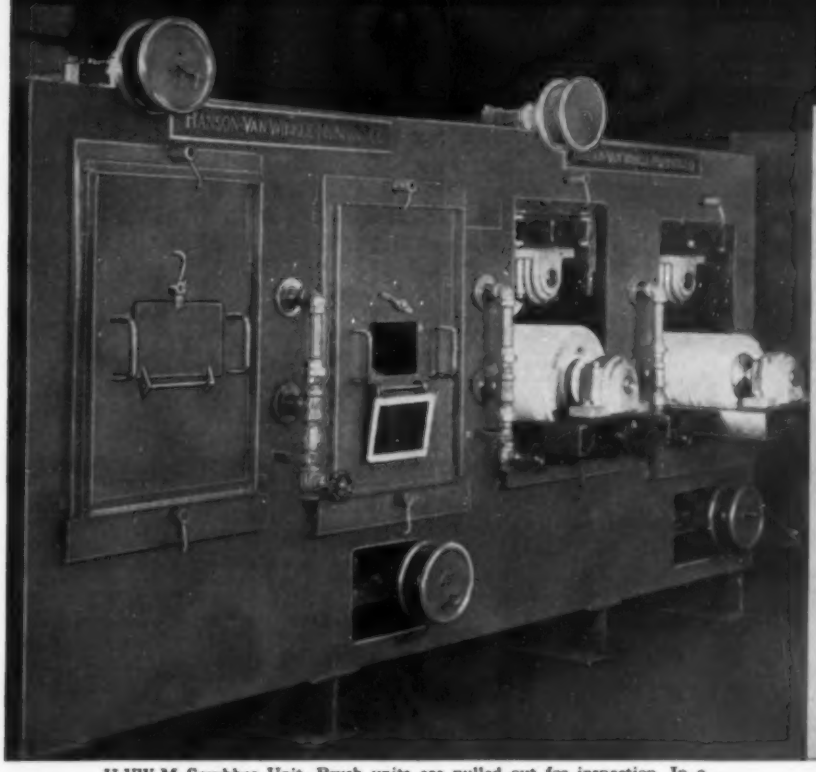
The switching of tin concentrates from the closed U.S. Texas City tin smelter to the open market has not had a noticeable effect on the market. It could be May before some 1500 extra tons of tin find their way to market.

NONFERROUS PRICE RECORD

	Price Mar. 13	Last Change	Previous Price	Feb. Avg.	Jan. Avg.	Mar., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	31.00–32.00	Feb. 19, 1957	31.00–34.00	32.863	35.433	49.727
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	99.125	Mar. 12, 1957	99.375	101.159	101.480	106.606
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld. **Cobalt:** 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $50-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 99.125; prompt, 98.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 22.50-29.25; No. 12 foundry alloy (No. 2 grade), 22.50-23.50; 5% silicon alloy, 0.60 Cu max, 24.75-26.00; 13 alloy, 0.60 Cu max, 24.75-26.00; 195 alloy, 24.50-26.75; 108 alloy, 22.50-23.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.00; grade 3, 21.00; grade 4, 20.25.

Brass Ingot: Red brass No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	.....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam., (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	137.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.06	51.68	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	56.84	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 22.00-22.50; light copper, 19.50-20.00; No. 1 composition red brass, 20.00-20.50; No. 1 composition turnings, 19.00-19.50; yellow brass turnings, 12.00-12.25; new brass clippings, 18.50-19.00; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.00-16.50; brass pipe, 16.75-17.25.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 70.00-85.00; old sheets, 65.00-80.00; turnings, 55.00-75.00; rods, 70.00-90.00.

Nickel: Sheets and clips, 140.00-185.00; rolled anodes, 140.00-185.00; turnings, 125.00-160.00; rod ends, 140.00-185.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.50-18.00; 3003 clippings, 17.50-18.00; 6151 clippings, 17.50-18.00; 5052 clippings, 17.50; 2014 clippings, 16.50-17.50; 2017 clippings, 16.50-17.50; 2024 clippings, 16.50-17.50; mixed clippings, 16.50-17.00; old sheets, 14.50-15.00; old cast, 14.50-15.00; clean old cable (free of steel), 17.00-17.50; borings and turnings, 15.00-16.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 17.00; yellow brass turnings, 16.00; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 16.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (anhydrous): Less than 25 lb, 167.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 98.90.

Stannous Sulphate: Less than 50 lb, 130.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 53.55; 1000 lb and over, 53.55.

(*Concluded from page* 195)

Scrap supplies at dealers' yards are light, with collections slow.

Cincinnati — The scrap market has drifted lower without any buying test. The limited buying programs of area mills at the beginning of the month brought a bearish mood to the market. That tone continues, with drops of 50 cents to $2 a ton on major steelmaking grades. Cast grades remain firm. No. 1 heavy melting is quoted at $44.50-$45.50, brokers' buying price, off 50 cents. The $2 a ton decline came in the rail items of 18 in., to $67-$68, and random lengths, to $57-$58.

Birmingham—The export trade is drawing scrap from much farther inland than previously because of a slowdown in buying by domestic consumers. The only sales of open-hearth scrap here since the first of the year have been No. 2 heavy melting and No. 2 bundles. The electric furnace and cast markets are quiet, although one consumer bought limited quantities of No. 1 cupola cast at $52. It also purchased stove plate at $50. Some cast scrap is being exported.

San Francisco—Cast scrap prices eased a bit here last week, but steel scrap quotations held unchanged. No. 1 cupola cast was moved at $57, off $3 a ton.

Los Angeles—Although dealers report a slight firming up in the scrap market, prices generally are unchanged. Machine shop turnings have moved $2 upward to $36 a ton. Mill purchases continue erratic, with large scrap consumers depending on inventories.

Seattle—Scrap receipts are equal to active demand on domestic and export account. The market is steady. Japanese importers are disappointed by government restrictions on shipments of heavy melting grades. Dealers expect a stronger call for the lower grades, particularly bundles.

The charter market for full cargo scrap ships is somewhat weaker. From a high of $350,000 (freight) from the Atlantic to Japan, rates have dropped to $290,000 in the last 30 days. Restricted export licensing is a factor.

TOP-NOTCH STAINLESS STRIP MAN

Well established steel producer needs experienced sales engineer in stainless strip sales. Opportunity to start on ground floor in an expanding company. Must be willing to travel and be able to sell. Basic knowledge of stainless strip production methods and problems is required. Progressive management and has all fringe benefits. Replies will be held in confidence. Send complete resume and salary requirements.

Box 523, STEEL
Penton Bldg. Cleveland 13, Ohio

WANTED IMMEDIATELY

2 used 8½" roll Flattening machines with takeup, for Steel wire. Speed range 100 to 400 fpm, 240 volts, D. C.

Reply Box 524, STEEL
Penton Bldg. Cleveland 13, Ohio

MOTORS • GENERATORS
TRANSFORMERS
NEW • REBUILT
World's Largest Inventory
ELECTRIC EQUIPMENT COMPANY
Phone Station Collect GL 3-6783
P. O. Box 51, Rochester, New York

CLASSIFIED

Help Wanted

WANTED: METALLURGIST FOR NEW ENGLAND foundry producing carbon low alloy and stainless steel castings. Should be metallurgical graduate with technical ability direct laboratory and melting furnaces. Submit resume giving experience, education, age, and salary expected. Reply Box 528, STEEL, Penton Bldg., Cleveland 13, Ohio.

WE HAVE AN OPENING IN OUR ORGANIZATION for a Chief Engineer. He will be required to do some detail work on structural steel, steel stairs, fire escapes and other miscellaneous items together with his supervisory work. At present, we have four (4) draftsmen who would be under him. For further information, write Ornamental Metalworks Company, P.O. Box 989, Decatur, Illinois, stating qualifications and experience.

Positions Wanted

METALLURGICAL ENGINEER: B.S. degree, age 41, married. Fifteen years experience in development and control of materials and processes. Material failure analysis, metallurgical consultation on design, and manufacturing problems. Headed metallurgical department and chemistry laboratory. Desires position as metallurgical consultant or metallurgical or development department head. Resume upon request. Will consider relocating. Reply Box 529, STEEL, Penton Bldg., Cleveland 13, Ohio.

PRODUCTION ENGINEER:—Progressive & deep draw specialist. If you want experience & knowledge for applying it, I'm your man. Age 47. Box 527, STEEL, Penton Bldg., Cleveland 13, Ohio.

COMBUSTION ENGINEER: Steel mill and industrial furnace experience: available for part time sales Central-East Penna. Reply Box No. 530, STEEL, Penton Bldg., Cleveland 13, Ohio.

PLANT SUPT. WIDE EXPERIENCE IN Supervising and Production and Jobbing both Structural and Machine also Fixture, Tool and Gauge Design. Write Box 531, STEEL, Penton Bldg., Cleveland 13, Ohio.

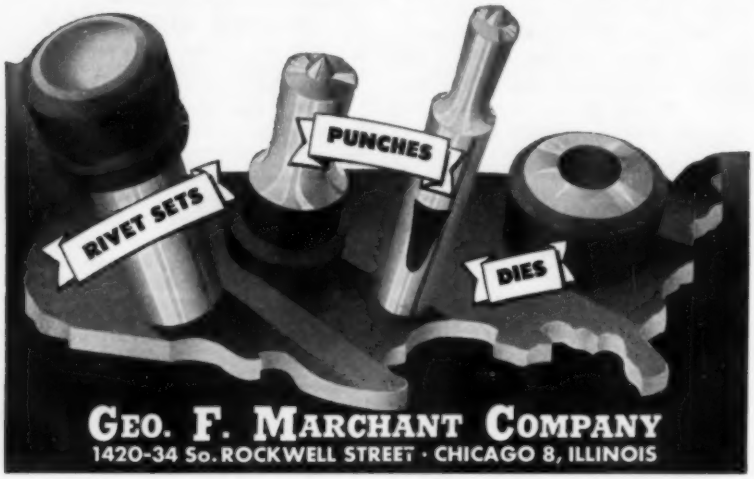
FOR CLASSIFIED RATES
And Further information write
STEEL., Penton Bldg., Cleveland 13, O.

NATIONAL SUPPLIER FOR 54 YEARS

Punches, Dies, Rivet Sets, "Heatproof" Compression Dies.

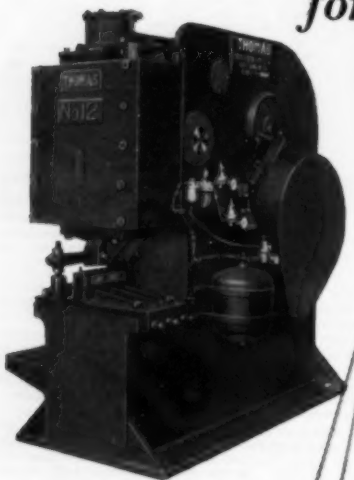
Round, square, oblong Punches and Dies—Rivet Sets carried in stock.

Write Dept. A for catalog 54 and new stock list.



GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

THE TREND IS TO THOMAS *for* production cutting of bars or angles



This all-steel Thomas machine is available in capacities of 50 through 600 tons. It can be supplied with tools for shearing flats, rounds or angles, or fitted with punching tools.

• *Machine is shown tooled for flats. Modern Thomas design makes this machine a compact, space-saving, self-contained, unit for shearing or punching.*

THOMAS MACHINE MANUFACTURING CO.
PITTSBURGH 22, PA.

Punches • Shears • Presses • Spacing Tables • Benders

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Red Circle Rolls for all Purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

Chilled Rolls
Alloy Iron Rolls
Moly Rolls
Nickel Chilled Rolls
Grain Rolls
Cold Rolls
Sand Rolls

for
Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS • ROLLING MILL MACHINERY
GREY IRON CASTINGS

New Speed Record in Baltimore for Erection of Structural Steel

Steelwork erected at the rate of 300 tons per week—that's the record set for Baltimore recently during the construction of the Commercial Credit Building, attractive new home office for Commercial Credit Corporation. The 4,850-ton framework for the 20-story structure was erected in just over sixteen weeks, using Bethlehem High-Strength Bolts as connectors for the structural members.

Bethlehem High-Strength Bolts save time in erecting steelwork because they can be installed quickly by two men, one using a holding wrench, the other a calibrated impact wrench. Each bolt is used with two hardened washers, one placed under the head, the other under the nut. The joints thus obtained are tight and sound.

High-strength bolting also has other advantages. It is relatively free from noise, making it a desirable form of construction for hospital and school areas. What's more, there are no fire hazards to contend with, as the bolts are installed cold.

Bethlehem High-Strength Bolts are made of carbon steel in popular sizes, and are quenched and tempered to meet the requirements of ASTM Specification A-325. Their use is explained fully in our 24-page booklet on high-strength bolting. If you would like to have a copy for reference, just drop a line to the nearest Bethlehem sales office.

COLOR MOVIE ON BOLT-MAKING

The entire story of the manufacture of fasteners is told in our interesting color film, "Holding Power." 16 mm, with sound. Showing time, 25 minutes. If you would like to have a print for showing, please write to us at Bethlehem, Pa.

Using Bethlehem High-Strength Bolts, Bethlehem ironworkers erected 4,850 tons of steelwork for Commercial Credit Building in just over sixteen weeks, setting new speed record for steel erection in Baltimore. *Architects:* Harrison & Abramovitz, New York; *Structural Engineer:* Edwards & Hjorth, New York; *General Contractor:* Consolidated Engineering Co., Inc., Baltimore.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

To demonstrate absence of vibration, a quarter was placed on the Cleveland unit. It remained upright through continuous clutching and declutching cycles and was still standing next morning after an overnight run-in test. Drive pictured at left was built by the Patton Mfg. Co., Springfield, O.

CLEVELAND-equipped mill drive offers vibration-free operation

IN a paper mill it is important that the output shaft of the gear reducer deliver smooth power to the paper-making machine. If this is not the case, the very sensitive draws between sections of the machine will not be maintained and the sheet of paper will break, causing an appreciable production loss.

In this new machine drive, smooth vibration-free power delivery is insured by its rugged transmission unit—a Cleveland Worm Gear Speed Reducer. Both drive makers and users know from years of experience that any Cleveland will transmit power from motor to its driven machine smoothly, quietly, continuously, dependably.

So wherever you need compact, right-angle speed reducers that will serve dependably under all conditions, specify Cleveland, the pace setter in power transmission since 1912.

Write for Catalog 400 and the name of our representative near you. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Drives

☆ ☆ ☆

Machine designers say these new heavy duty pushbutton units have no equal and prove it by adopting them as standard equipment

These are the world's smallest heavy duty pushbuttons. They require a behind-the-panel depth of only 1 3/32". This is 40% less space than needed by the next smallest units on the market. Double-pole contact blocks are available in all combinations of normally open and normally closed contacts. Each control circuit is electrically and mechanically isolated from the other. Each circuit is clearly identified and all terminals are color coded. Rapid on-the-job circuit additions are obtained by stacking contact block on contact block.

☆ *they install easier*

☆ *they work better*

☆ *they last longer*

Design engineers are quick to recognize that these new heavy duty pushbuttons have *everything*. There is nothing on the market like them. They are amazingly compact to require the least back-of-panel depth. They are one-hole mounting and they are oil tight. They easily provide for as many as eight separate control circuits per pushbutton, eight completely isolated heavy duty contacts either normally open or normally closed. The buttons may be flush type, the extended type or with mushroom heads. They can be black, red, yellow, green or gray. See the new one-button control station, C-H Roto-Push. See the easiest-to-install maintained-contact pushbutton attachment and the means for padlocking any of the standard pushbuttons. There are both knob and key operated selector switches in this complete line. Also matching indicating lights and the new automation safety light, PresTest. Be sure you have complete information *now*. Write today on your company letterhead for a copy of the new Cutler-Hammer Pushbutton Handbook Pub. EL-178. CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

These pushbuttons may be flush type, extended type or with mushroom heads . . . in a wide range of colors for quick control identification. Standard, large, and jumbo size legend plates fit every type of operator and indicating light in the entire line.

A maintained-contact pushbutton assembly that saves more than its entire cost by installation savings. New attachment with its pushbuttons mount in minutes: no fussy adjustments. Neither alignment nor spacing of units is critical. Pushbuttons will not bind or stick; always operate perfectly.

CUTLER-HAMMER
☆ ☆ ☆
MOTOR CONTROL
C-H

The C-H one-hole mounting oil-tight indicating lights with new wide-visibility lenses are the most visible from all angles by actual light meter tests. Available in either transformer or resistor types. Lenses offered in six clear, tinted colors.

PresTest . . . the self-testing indicating light vital to safety and proper use of machines, particularly in automation. PresTest now permits instant proof light is NOT off because of burned-out bulb. Merely pressing on the light lens disconnects bulb from the normal circuit and checks it on a test power supply. Resistor and transformer types available.

The most complete line of oil-tight selector switches on the market. Key or knob operated, two or three position. Positions may maintain contact or have spring return. Three standard contact blocks provide a wide range of circuit combinations with the use of just a single block. Unusual versatility in wiring blocks.

Roto-Push . . . the one-button control station. One Roto-Push can provide all the control functions for which two or three separate pushbuttons would be used normally. Available in a wide range of selector and button operators, Roto-Push simplifies panel design and saves installation time to cut costs, maximize machine operator efficiency.